Association Between BMI and Dental Caries in Children

Aya S DDS, Leskiv K DDS, Kwon S DMD, Li N DMD, Dowrich IA DDS

BronxCare Health System, Bronx, NY

Purpose

To determine if children with early childhood caries (ECC) and severe early childhood caries (S-ECC) are more likely to have a higher BMI as compared to caries-free children between ≥24 and ≤71 months of age in the BronxCare Health System patient population.

Introduction

Obesity is recognized as a "global epidemic disease" by the World Health Organization, and the prevalence of overweight and obese children has significantly increased in recent years.[1] Many health risks are associated with obesity. The risks of morbidity and mortality are increased with childhood obesity leading into adult obesity. High BMI can be an indicator of high body fat percentage.[2]

Dental caries is the most prevalent chronic disease in US children with more than 28% experience dental caries by the time they reach kindergarten.[3] Dental caries and obesity share common predisposing factors, such as diet, lifestyle, genetics, socioeconomic status and other environmental factors.[3]

Many studies hypothesize that obesity and increased weight status might be an indication for a higher risk of dental caries in the pediatric population.[3,4] However, other studies have noted that lower weight status is associated with greater caries experience.[5]

Methods

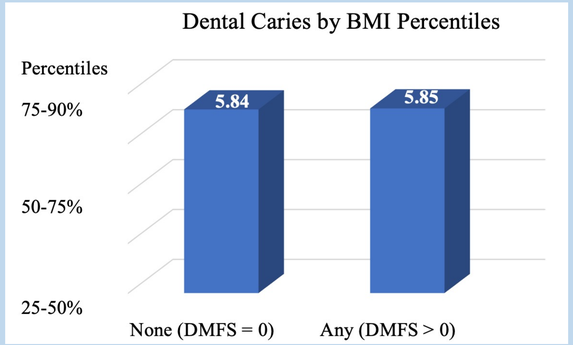
- Retrospective chart review
- Duration: January 2019 to July 2019
- Inclusion Criteria:
  - Present for comprehensive or recall exam
  - ASA I or ASA II
  - ≥24 months and ≤71 months of age
- 861 children were eligible for the study
- Following were recorded:
  - Age, BMI, gender, and DMFS
- ECC/S-ECC status categorized based on age and DMFS

Results

Demographic and Dental Profile (Table 1):

		Frequency	Percent
Age (years)			
	2	172	20.0
	3	223	25.9
	4	252	29.3
	5	214	24.9
Gender			
	Female	446	51.8
	Male	415	48.2
BMI percentiles			
	< 5	39	4.5
	5-10	17	2.0
	10-25	46	5.3
	25-50	90	10.5
	50-75	160	18.6
	75-90	155	18.0
	90-95	98	11.4
	>95	256	29.7
Weight classification			
	Underweight	39	4.5
	Normal	415	48.2
	Overweight	144	16.7
	Obese	263	30.5
DMFS index			
	0	450	52.3
	1-10	252	29.3
	11-20	83	9.6
	21-30	37	4.2
	31-40	16	1.7
	41-50	13	1.3
	51+	10	1.0

Comparison of BMI by DMFS index (Fig. 1):



Dental Caries	N	Mean	SD	z	p
None (DMFS = 0)	450	5.84	2.02	0.26	0.798
Any (DMFS > 0)	411	5.85	1.89		

- BMI percentiles were not higher in children with DMFS indices above zero (not statistically significant)

Comparison of Overweight (BMI >85th)/Obese (BMI>95th) and Caries (Table 2):

	Dental Caries					
	DMFS = 0		DMFS > 0		χ2	p
Overweight						
No	231	51.3%	223	54.3%	0.74	0.391
Yes	219	48.7%	188	45.7%		
Obese						
No	309	68.7%	289	70.3%	0.28	0.600
Yes	141	31.3%	122	29.7%		
Total	450	100.0%	411	100.0%		

- No statistically significant relationships were found between the presence of dental caries and the higher weight classifications based on BMI percentiles.

Discussion

No statistically significant correlation between BMI and DMFS indices. (Fig 1). Although previous studies have hypothesized that obesity and increased weight status might be an indication for a higher risk of dental caries in the pediatric population, this study did not have similar results.[3,4]

This study also demonstrated no relationship between lower weight and caries experience unlike other previous studies.[5]

Limitation of this study is a skewed distribution of subjects based on BMI percentiles.

Conclusion

There is no relationship between BMI and dental caries in this patient population.

References

1) Institute of Medicine (US) Committee on Prevention of Obesity in Children and Youth; Koplan JP, Liverman CT, Kraak VI, editors. Preventing Childhood Obesity: Health in the Balance. Washington (DC): National Academies Press (US); 2005. 2, Extent and Consequences of Childhood Obesity. Available from: https://www.ncbi.nlm.nih.gov/books/NBK83819/
2) About child & TEEN BMI. 2021, March 17. Retrieved April 09, 2021, from https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html
3) Colak, H., Dülgergil, C. T., Dalli, M., & Hamidi, M. M. (2013). Early childhood caries update: A review of causes, diagnoses, and treatments. Journal of natural science, biology, and medicine, 4(1), 29–38. https://doi.org/10.4103/0976-9668.107257 4) Proceedings of the conference: Innovations in the prevention and management of early childhood caries. Pediatr Dent 2015;37(3):198-9.
4) Paisi, M., Kay, E., Bennett, C., Kaimi, I., Witton, R., Nelder, R., & Lapthorne, D. (2019). Body mass index and dental caries in young people: a systematic review. BMC pediatrics, 19(1), 122. https://doi.org/10.1186/s12887-019-1511-x
5) Davidson, Katherine et al. "Higher body mass index associated with severe early childhood caries." BMC pediatrics vol. 16 137. 20 Aug. 2016, doi:10.1186/s12887-016-0679-6