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Association between body mass index and caries among 13-year-old population in Castelo de Paiva, Portugal

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ABSTRACT

Objectives: The purpose of this study was to evaluate the association between dental caries and body mass index-for-age (BMI-for-age) in a 13-year-old population.

Methods: A cross-sectional study was carried out with a birth-cohort of 181 voluntary 13 year-old adolescents belonging to a grouping of schools in Castelo de Paiva. BMI-for-age, DMFT and oral hygiene habits were recorded. The Z-test, Mann–Whitney and the Kruskal–Wallis tests were used for univariate comparisons. Multivariate association between independent factors and DMFT > 0 or DMFT > 6 was assessed using backward stepwise binary logistic multivariate regression analysis (0.05 for covariate inclusion and 0.10 for exclusion).

Results: The mean DMFT was 4.04 (±2.79) with caries experience affecting 90.1% of adolescents and the majority had normal BMI-for-age (69.1%), 3.3% below normal and 27.6% had weight over normal.

Discussion: No significant differences were found for DMFT according to gender, school attendance, oral hygiene frequency or BMI-for-age. In multivariate analysis the oral hygiene frequency was shown to be significantly associated with DMFT higher than zero ($p = 0.041$). For a more severe DMFT value (DMFT > 6) this frequency was not statistically important, whereas the lack of performing oral hygiene at night showed to be a significant risk factor for severe DMFT ($p = 0.006$). The oral hygiene habits showed to be a better predictor than BMI-for-age for the development of caries disease prediction.

Conclusion: This study confirms that no association could be assigned between BMI-for-age and dental caries in children especially in permanent dentition.

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Associação entre IMC e cárie aos 13 anos de idade no Concelho de Castelo de Paiva

R E S U M O

Objetivos: O objetivo deste trabalho foi avaliar a associação entre cárie dentária e índice de Massa Corporal ajustado para idade (IMC-para-idade).

Métodos: Estudo transversal populacional realizado em 181 voluntários adolescentes de uma coorte de 13 anos de idade, pertencentes a agrupamentos de escolas em Castelo de Paiva. Foram registados o IMC-para-idade, o CPOD e hábitos de higiene oral. Os testes Z, Mann–Whitney e Kruskal–Wallis foram usados para comparações univariadas. Análise multivariada de fatores associados com CPOD>0 e CPOD>6 foi realizada com análise de regressão multivariada logística bivariada (0,05 para inclusão, 0,10 para exclusão de co-variáveis).

Resultados: O CPOD foi de 4,04 (±2,79), com experiência de cárie que afeta 90,1% dos adolescentes, sendo que a maioria tinha um IMC-para-idade normal (69,1%), 3,3% abaixo do normal e 27,6% tinham peso superior ao normal.

Discussão: Nenhuma diferença significativa foi encontrada para CPOD de acordo com o sexo, a frequência escolar, frequência de higiene bucal ou IMC-para-idade. Na análise multivariada a frequência de higiene oral mostrou-se associada significativamente com CPOD maior que zero (p=0,041). Para um valor de CPOD mais grave (CPOD> 6) esta frequência não foi estatisticamente importante, considerando que a ausência da realização de higiene bucal à noite mostrou ser um fator de risco significativo para CPOD grave (p=0,006). Os hábitos de higiene oral mostraram ser um melhor preditor do que o IMC-para-idade para o desenvolvimento de previsão de doença cárie.

Conclusão: Este estudo confirma que não deverá ser considerada nenhuma associação entre IMC-para-idade e cárie dentária em crianças, especialmente na dentição permanente.

Introduction

Worldwide there is a growing overweight epidemic among children and teenagers.[1–5] In general, the weight of the individuals is measured by means of the body mass index's (BMI). Overweight and obesity are important public health problems, associated with an increased risk for the development of future medical problems such as cardiovascular diseases, cancer and diabetes mellitus.[6]

Obesity has reached epidemic levels in recent years. The average obesity rate in the European Union is 15.5%, and, even more alarming, the prevalence of overweight children was estimated at 30% in 2006.[7]

Data on the prevalence of overweight and obesity among Portuguese children and adolescents (10–18 years old, Madeira region, and 7–14 years old, Mafra, respectively) using the CDC criteria reveal that the prevalence of overweight was between 8.3% and 16% for males and 18.9% and 35% for females, and the prevalence of obesity varied between 15% and 26% for males, and 12.2% and 20% for females.[8,9]

Some studies[3,10] show that the prevalence of overweight and obesity in children increased in magnitude from two to five times in developed countries and up to almost four times in developing countries.

Theoretically, overweight and obesity can be associated with dental caries, through a greater availability of cariogenic factors, modulated by oral hygiene habits. Given the causal relation between refined carbohydrates and dental caries, it is appropriate to hypothesize that overweight might also be a marker for dental caries in children and teenagers.[11–17]

While the consequences of obesity will have an indirect effect on oral conditions, this alone is no justification for the disease.[18] Dental caries and obesity are both multifactorial conditions with a complex aetiology and are associated with such factors as dietary habits and available nutrients, oral hygiene or saliva. A sugar-rich diet, including beverages, is associated with various health problems such as obesity and dental caries. Although the eating pattern among overweight and obese children may represent a risk of dental caries, documentation is scarce, and a systematic review has revealed contradictory results, mainly in paediatric populations[5,12,16,19]

Two studies conclude that overweight and obese adolescents had more caries than normal-weight individuals,[16,20] a third one[14] concluded that only on 12-year-old children caries was associated with BMI increase, and another[21] found this association only in primary dentition. A recent study[22] found, for the first time, a relationship between dental caries prevalence and body fat percentage measured by DXA and attributed this to a misclassified adiposity status of the paediatric population evaluated by BMI compared to Dual energy X-ray Absorptiometry (DXA).

Obesity alone was not a good predictor of dental decay, the combination between earlier obesity and caries experience being even better for the prediction of caries in permanent second molars than in the permanent first molars.[23] An inverse