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INTRODUCTION

Improving bone mass acquired during childhood and adolescence is an important strategy to prevent osteoporosis later in life. The positive relation between dairy products intake and bone mass accrual is well described. However, quantifying the effect of dietary patterns, rather than that of specific foods, may add relevant information to design public health interventions. The beneficial effect of the Mediterranean dietary (MD) pattern on several chronic diseases is well known. This pattern is characterized on the one hand by low dairy consumption but on the other hand by high consumption of fruits and vegetables. The association of the MD pattern with bone mass has not been estimated during the decades of most bone accrual.

OBJECTIVES

To quantify the association between adherence to the Mediterranean dietary pattern and forearm bone mineral density in a sample of 13 year-old adolescents.

METHODS

As part of the EPITeen cohort, we evaluated 1 232 13-year-old adolescents (44.7% males) attending schools in Porto, Portugal (78% participation at the student level). Adolescents' evaluation included height and weight, measured using a digital scale and a portable stadiometer, and forearm bone mineral density (BMD) measured by dual-energy X-ray absorptiometry. Dietary intake was assessed using a semi-quantitative food frequency questionnaire with 91 foods/food group items. Adherence to the MD pattern was evaluated through an adapted MD score (KIDMED index¹). The final score, the sum of the values from all items, was classified into three adherence levels, -2 to 3; 4 to 6 and ≥ 7 , where a higher level reflected greater adherence to the Mediterranean diet.

The association between adherence to MD pattern and BMD was quantified using linear regression. Coefficients were adjusted for body mass index (BMI), physical activity, smoking status and parents' education.

RESULTS

Mean (standard deviation) BMD was 0.361 (0.058) g/cm² in girls and 0.344 (0.051) g/cm² in boys. Low adherence to the MD pattern was observed in 23.9% of the girls and in 22.5% of the boys and 47.3% of girls and 46.1% of boys had intermediate index results (Figure 1). After adjustment, a positive association was found between adherence to the MD pattern and BMD, taking the low adherence level as the reference, and statistically significant higher average BMD was found among boys with intermediate and high adherence to the MD pattern (Figure 2 and Table 1).

Figure 1. Distribution (%) of boys and girls by levels of adherence to the MD pattern

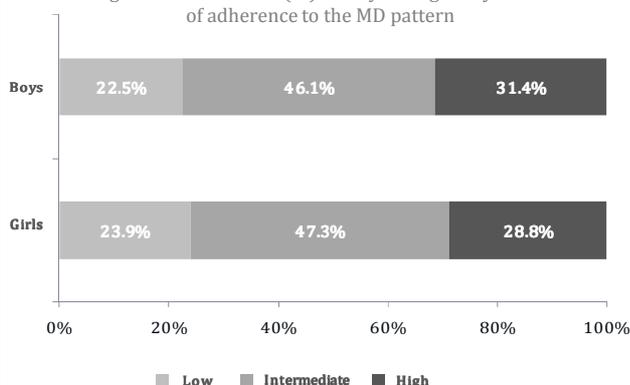


Figure 2. Mean forearm BMD in g/cm² (95% CI) according to levels of adherence to the MD pattern, by sex

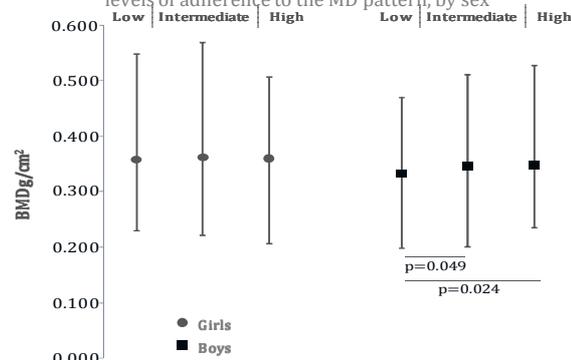


Table 1. Linear regression coefficients and 95% CI for the associations between BMD in g/cm² and levels of adherence to the MD pattern, BMI, physical activity and parents' education

	Girls		Boys	
	Crude coefficients (95% CI)	Adjusted coefficients* (95% CI)	Crude coefficients (95% CI)	Adjusted coefficients* (95% CI)
Levels of adherence to the MD pattern				
Low	ref	ref	ref	ref
Intermediate	0.005 (-0.006; 0.016)	0.006 (-0.004; 0.015)	0.013 (0.002; 0.024)	0.013 (0.003; 0.023)
High	0.002 (-0.009; 0.014)	0.005 (-0.006; 0.016)	0.016 (0.004; 0.027)	0.018 (0.006; 0.028)
Body Mass Index				
Per kg/m ²	0.008 (0.007; 0.009)		0.006 (0.005; 0.007)	
Physical activity				
Never	ref		ref	
≤1time /week	-0.003 (-0.015; 0.009)		-0.006 (-0.023; 0.011)	
2-3times/week	-0.008 (-0.019; 0.004)		-0.001 (-0.016; 0.014)	
>3times/week	0.001 (-0.013; 0.016)		-0.002 (-0.017; 0.014)	
Parents' education				
≤4 years	ref		ref	
5 - 9 years	0.013 (-0.001; 0.028)		-0.004 (-0.020; 0.011)	
10 - 12 years	0.011 (-0.004; 0.025)		0.002 (-0.014; 0.017)	
>12 years	0.008 (-0.006; 0.023)		-0.002 (-0.017; 0.014)	

* Adjusted for BMI, physical activity and parents' education

CONCLUSION

Although characterized by low intake of dairy products, the adherence to a Mediterranean dietary pattern can be associated to better bone health since early in life.

¹ Serra-Majem L et al. Public Health Nutr 2004; 7(7):931-5