



# ONSET OF PUBERTY IN HEALTHY BOYS IS ASSOCIATED WITH A LOWER BMI COMPARED TO VALUES PRIOR TO THE ONSET OF PUBERTY

Rüveyde Bundak, Feyza Darendeliler, Firdevs Baş, Şükran Poyrazoğlu, Hülya Günöz, Olcay Neyzi

Istanbul University, Istanbul Faculty of Medicine, Pediatric Endocrinology Unit, Turkey



Nothing to disclose.

**Background:** In several studies it has been shown that body mass index (BMI) influences the timing of puberty, mostly in girls, but has not been a consistent finding in boys.

**Aim :** To investigate the association between BMI and timing of pubertal onset in a population based sample of Turkish boys.

**Results:** The results of only the longitudinally followed children are given here. In this subsample of 227 boys, who were followed longitudinally, age at onset of puberty was  $10.9 \pm 1.0$  (9-13.8) years. Mean BMI-SDS was  $0.09 \pm 1.2$  during prepubertal time before the onset of puberty and mean BMI-SDS at onset of puberty was  $0.02 \pm 1.3$ , significantly lower than the prepubertal period ( $p=0.0001$ ). In this subsample of boys the mean delta BMI-SDS was  $-0.07 \pm 0.7$  from the time testes volume 2ml to the time of testes volume 4ml.

Age and BMI-SDS at onset of puberty according to socioeconomic status (SES) are given in the Table . Mean age of onset of puberty was significantly earlier and mean BMI-SDS was significantly lower in low SES boys than high SES boys.

Percentage of boys according to BMI percentile-for-age at onset of puberty (attainment of a testicular volume of 4 ml) are given in the Figure. It is noteworthy that most of the boys attain a testicular volume of 4 ml at 25-75 BMI percentile-for-age . Percentage of thin boys based on BMI percentile-for-age were significantly higher compared with overweight and obese boys at onset of puberty ( $X^2 = 45.1$ ,  $P = 0.006$ ). This difference was marked between thin and obese boys.

**Subjects and methods:** Data on growth and pubertal development were collected by biannual visits to six primary and secondary level schools in Istanbul city. Of a total of 2016 boys, data of 1208 boys aged from 8 to 18 years evaluated. Over time, measurements were repeated on these same children, but other children were also included in the study to provide adequate numbers for the older age groups. Our sample consists of a mixture of children followed longitudinally over different periods of time. Measurement of testicular volume (TV) using a Prader orchidometer, was performed by one observer (RB) throughout the study. Evaluation of pubertal stages was also done at 6 monthly intervals. Attainment of a testicular volume of 4 ml was accepted as the onset of puberty. The data were entered in a FoxBase program and analyzed by using SPSS-PC.

**Table .** Age and BMI-SDS at onset of puberty according to SES

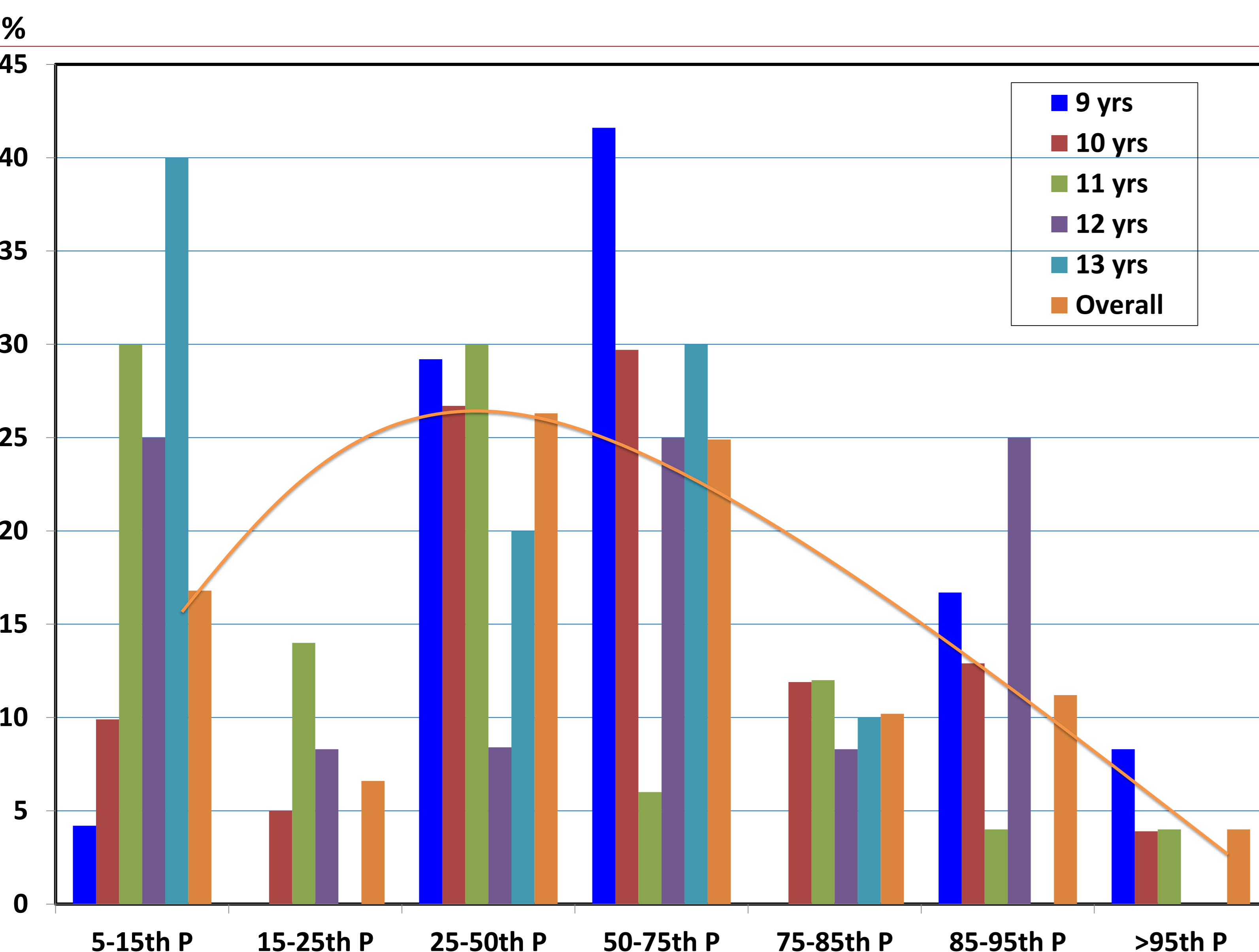
Parameters	Socioeconomic Status (Low)	Socioeconomic Status ( High )	P value
n	133	93	
Age at onset of puberty	$10.8 \pm 0.8$	$11.2 \pm 1.1$	<b>0.004</b>
BMI-SDS Prepubertal	$-0.02 \pm 1.3$	$0.3 \pm 1.2$	NS (0.06)
BMI-SDS At onset of puberty	$-0.13 \pm 1.3$	$0.28 \pm 1.3$	<b>0.02</b>
Delta BMI-SDS	$-0.1 \pm 1.3$	$-0.01 \pm 0.9$	NS (0.33)

## Conclusion

- The onset of puberty is associated with a lower BMI in healthy boys.
- Despite most of the boys start puberty at a certain threshold of BMI percentile-for-age ( 25-75 percentile), thinness is also a indicator for pubertal starting.

## References

1. Neyzi O, Bundak R, Gökçay G, Furman A, Darendeliler F, Baş F. Reference Values for Weight, Height, Head Circumference, and Body Mass Index in Turkish Children. *J Clin Res Pediatr Endocrinol.* 2015; 7(4):280-293
2. Bundak R, Darendeliler F, Günöz H, Baş F, Saka N, Neyzi O. Analysis of puberty and pubertal growth in healthy boys. *Eur J Pediatr.* 2007 Jun;166(6):595-600.
3. Willemsen RH, Dunger DB. Normal Variation in Pubertal Timing: Genetic Determinants in Relation to Growth and Adiposity. *Endocr Dev.* 2016;29:17-35.
4. Tomova A, Robeva R, Kumanov P. Influence of the body weight on the onset and progression of puberty in boys. *J Pediatr Endocr Metab* 2015; 28: 859-865.
5. Lee JM, Kaciroti N, Appugliese D, Corwn RF, Bradley RH, Lumeng JC. Body mass index and timing of pubertal initiation in boys. *Arch Pediatr Adolesc Med* 2010 164:139-144.
6. Lee JM, Wasserman R, Kaciroti N, Gebremariam A, Steffes J, Dowshen S, Harris D, Serwint J, Abney D, Smitherman L, Reiter E, Herman-Giddens ME. Timing of Puberty in Overweight Versus Obese Boys. *Pediatrics* 2016 Feb;137(2):e20150164. doi: 10.1542/peds.2015-0164. Epub 2016 Jan 27.



**Figure.** Distribution of boys according to BMI percentile-for-age at onset of puberty (%).

