

Table S1 Characters of literature between overweight/obesity and precocious puberty

Author	Year	Sample size	Age	Ethnic	Design	Country	Definition of overweight/obesity	Definition of precocious puberty/early puberty	Association of obesity and precocious puberty
Current study	2014	17620	6-12 years	Chinese	Cross-sectional study	China	WHO Overweight: BMI \geq 1SD, Obesity: BMI \geq 2SD	Girls: breast Tanner stage 2 or above before 8 year old; Boys: Testicular volume \geq 4 ml before 9 year old;	Prevalence of precocious puberty in 4.17% boys and 48.54% girls with overweight; 4.85% boys and 61.86% girls with obesity; Prevalence of overweight in 22.05% boys and 26.01% girls with precocious puberty; 25.98% boys and 13.76% girls for obesity with precocious puberty
Adair LS <i>et al.</i>	1988-1991	6507 girls	12-17 years	54.8% non-Hispanic White, 21.1% non-Hispanic Black, 17.0% Hispanic, 7.1% Asian;	Longitudinal study	America	Overweight: BMI \geq 85th percentile;	Age at menarche: maturing early (younger than 11 years average); maturing late (11–13); maturing late (14 years or older);	Prevalence of overweight was 41.5%, 25% and 18.7% in early, average and late maturing girls respectively.
Atay Z <i>et al.</i>	2009	820 girls	4-8 years	-	Cross-sectional study	Turkey	BMI standard deviation scores (SDS)	Premature thelarche (PT); Premature pubarche (PP)	56.1% girls were PT with BMI SDS values above 1 in the PT group; 31.4% girls were PP with BMI SDS values above 1 in the PT group;

Dai YL <i>et al.</i>	2009-2010	8895 girls 9812 boys	6-18 years	Chinese	Cross-sectional study	China	Chinese Working Group on Obesity, Overweight: BMI \geq 85th percentile; Obesity: BMI \geq 95th percentile	tertiles on the timing of breast and testicular Tanner stage 2 or more (early-maturing group: earliest tertile; non-early-maturing: average and late maturers)	Median age of B2 was 9.69 years; Median age of G2 was 11.25 years; OR and 95% CIs for overweight were 1.48 (1.22–1.79) for boys and 2.64 (2.16–3.23) for girls, and for obesities were 1.61 (1.22–2.11) and 3.49 (2.59–4.70), respectively
Davison KK <i>et al.</i>	-	181 girls	5-9 years	-	Longitudinal study	America	American 2000 CDC criteria: BMI percentiles	At 9 years: estradiol levels; breast Tanner stage 3; pubertal Development Scale Testicular volume > 4 ml; advanced bone age > 1 year above chronological age; pubertal LH peak values; serum testosterone levels;	BMI percentile was 79.6 and 59.4 in earlier puberty and later puberty girls
Lee HS <i>et al.</i>	2003-2010	104 boys	Mean age of 8.7 years	Korean	Cohort study	Korea	Overweight: BMI \geq 85th percentile; Obesity: BMI \geq 95th percentile	Overweight: BMI \geq 85th percentile; Obesity: BMI \geq 95th percentile	Testicular volume was 6.8 ml (normal weight), 5.9 ml (overweight) and 6.1 ml (obesity)
Lee JM <i>et al.</i>	1991	401 boys	2-11.5 years	White (79.5%); Nonwhite (20.5%)	Longitudinal study	America	Overweight: BMI \geq 85th percentile; Obesity: BMI \geq 95th percentile	Genitalia Tanner stage 2 before age 11.5 years	49 boys (12.2%) were prepubertal at age 11.5 years by Tanner genitalia staging

Rosenfield RL <i>et al.</i>	1988-1994	-	8- 18 years	Non-Hispanic white, non-Hispanic black, Mexican American	Cross-sectional study	America	normal BMI (10th–84th percentile); excessive BMI (85th percentile)	Thelarche stage 2; pubarche stage 3; menarche	The median age were 10.81 and 9.79 of breast stage 2, 11.57 and 11.39 of pubarche stage 3, 12.57 and 12.06 of menarche in normal and excessive BMI group respectively;
Sorensen K <i>et al.</i>	1991–1993; 2006–2008;	1528 boys	5.8-19.8 years	Caucasian origin	Cross-Sectional study; Longitudinal study	Denmark	American 2000 CDC criteria, Overweight: BMI≥85th percentile; Obesity: BMI≥95th percentile	Testicular volume > 3 ml; genital stages 2 (G2);pubic hair stages 2 (PH2)	Median age of G2 was 11.83 years in 1991 and 11.59 years in 2006; Median age of PH2 was 11.89 years in 1991 and 12.38 years in 2006; Median age of TV was 11.92 years in 1991 and 11.66 years in 2006
Wang Y <i>et al.</i>	1988-1994	1501 girls; 1520 boys	8-14 years	Non-Hispanic white (25%), non-Hispanic black (36%), Mexican American (35%)	Cross-sectional study	America	American 2000 CDC criteria, Overweight: BMI≥85th percentile; Obesity: BMI≥95th percentile	Girls: breast Tanner stage 2; Boys: genitalia stage 3, earlier than the median age for that stage.	Prevalence of overweight in 23% boys and 34% girls with early mature; 7% boys and 16% girls for obesity with early mature;