

Maternal BMI and infant anthropometrics in a multi-ethnic community

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With the rising prevalence of obesity, especially in deprived communities in the UK⁽¹⁾, there are increased risks for maternal and fetal health such as gestational diabetes, pre-eclampsia and complicated delivery⁽²⁾. However, also in deprived communities there is a higher incidence of low birth weight (LBW) and its associated infant mortality and morbidity⁽³⁾. The present study explores maternal BMI and infant anthropometrics in a multi-ethnic community in East London.

Women were recruited at their first antenatal appointment (*n* 402). Maternal and infant anthropometric measurements were taken by midwives and participants stated their own ethnic origin. Participants gave written consent and approval was given by the local research ethics committee.

There were no differences in gestational age at the first appointment between BMI groups (81–84 d). Half the sample had a BMI of ≥ 25 kg/m², indicating that they were overweight at the start of their pregnancy, and of these 20% were classified as obese (BMI > 30 kg/m²).

BMI (kg/m ²)....	<i>n</i>	<20		20–24		25–29		>30		BMI (kg/m ²)	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	Mean	SD
Total group	402	37	9	162	40	124	31	79	20	26.1	5.6
Ethnicity:											
African	111	5	5	41	37	38	34	27	24	27.1 ^d	5.7
Asian	42	14 ^{***}	33	13	31	12	29	3	7	23.3 ^c	4.4
Caucasian	155	14	9	72	47	43	28	26	17	25.6	5.7
West Indian	66	2	3	21	32	24	36	19	29	27.5 ^d	5.0
Other	28	2	7	15	54	7	25	4	14	25.7	5.7
Mean age (years)		25.2 ^a		27.5		29.1 ^b		29.7 ^b			

^{a,b}Values within the row with unlike superscript letters were significantly different (ANOVA; *post-hoc* Tamhane 2; *P* < 0.001). ^{c,d}Values within the column with unlike superscript letters were significantly different (ANOVA; *post-hoc* Tamhane 2; *P* < 0.001). Value was significantly different from those for other ethnic groups (χ^2): ^{***}*P* < 0.001.

Asians were more likely to have a BMI < 20 kg/m² (*P* < 0.001) and the mean BMI differed between the ethnic groups, with Asians having a lower mean BMI than African and West Indians (*P* < 0.001). The mean age also differed by BMI group: those with a BMI < 20 kg/m² were significantly younger than those with a BMI of 25–29 kg/m² and > 30 kg/m² (*P* < 0.001).

Maternal BMI (kg/m ²)....	<20		20–24		25–29		>30		<i>P</i>
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Birth weight (BW; g)	2817 ^a	485	3257 ^b	492	3249 ^b	602	3381 ^b	379	<0.001‡
Crown–heel length (cm)	50.1	3.13	51.3	3.52	51.4	3.50	51.5	3.21	0.278
PI	2.31	0.41	2.43	0.38	2.45	0.44	2.51	0.37	0.124
Head circumference (cm)	33.1	2.57	33.8 ^{**}	1.64	34.0	1.42	34.0 [*]	1.50	0.037‡
BW for age SDS	−0.99	0.82	−0.37†	0.92	−0.29††	1.06	−0.16†††	0.78	<0.001‡
No. with BW < 2.5 kg	5		7		9		0		0.017§
No. with BW > 4.0 kg	0		5		14		5		0.016§
No. SGA	13		24		18		6		0.003§

n 353. PI, ponderal index (100 × (weight (g)/length (cm³))); SDS, SD score; SGA, small for gestational age defined as < 10th centile BW for gestational age. ^{a,b}Values within the row with unlike superscript letters were significantly different (Tamhane 2; *P* < 0.001). Values were significantly different from those for < 20 kg/m² group (Tukey-HSD): ^{*}*P* = 0.044, ^{**}*P* = 0.028. Values for SDS were significantly different from those for < 20 kg/m² group (Tamhane 2): [†]*P* = 0.002, ^{††}*P* = 0.001, ^{†††}*P* < 0.001. [‡]ANOVA. [§] χ^2 .

Women with a BMI < 20 kg/m² gave birth to infants who on average weighed less, had a smaller head circumference and had a lower birth weight for gestational age SD score than those from the other BMI groups. However, there was no difference in thinness as measured by ponderal index. Mothers in the highest BMI group were less likely to have an infant who was small for gestational age (SGA) and mothers in the lowest BMI group were more likely to have an infant who was SGA (*P* = 0.003). Of women in the lowest BMI group 15% gave birth to an infant with a LBW compared with none in the highest BMI group.

In conclusion, in this diverse group of pregnant women, Asians had a lower BMI compared with other ethnic minorities. Infants were more likely to be LBW or SGA when maternal BMI was < 20 kg/m².

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