



Duration of Breastfeeding and Bone Mineral Density in Childhood: A Prospective Study Among Preschool Children



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BACKGROUND:

- Bone growth and mineralization during childhood are now recognized as important for bone health in adulthood, leading to renewed interest in identifying modifiable factors that impact bone mineral density (BMD) in childhood.
- Emerging data suggest that duration of breastfeeding may affect BMD in later childhood and adult life. However, such data are sparse and inconsistent.

OBJECTIVES:

- This study examined the relationship between the duration of breastfeeding and BMD in young Asian children.

METHODS:

Subjects

- 149 healthy children (73 girls, 76 boys; 81 Chinese, 45 Malay and 23 Indian) from the Growing up in Singapore Towards healthy Outcomes (GUSTO) mother-offspring cohort participated in this study.
- Children born from IVF pregnancies and twins were excluded.

Exposure: Duration of Breastfeeding

- Duration of any breastfeeding (BF) regardless of exclusivity was categorized into 3 groups;
- Group 1: Shorter duration (never breastfed or breastfed till 3 months)
- Group 2: Intermediate duration (breastfed >3 to 6 months)
- Group 3: Longer duration (breastfed >6 months).

Outcomes of Interest: Dual-energy X-ray Absorptiometry (DXA) Scans

- DXA scans of the lumbar spine were performed (Hologic QDR discovery scanner) at age 6 years.
- Lumbar spine bone mineral apparent density (BMAD), i.e. volumetric BMD, was estimated from bone mineral content (BMC) and bone area (A) from L2-L4 ($BMC/A_p^{3/2}$).
- BMAD, areal BMD (aBMD), standard deviation scores (SDS) for BMAD (Z_{L-BMAD}) and aBMD (Z_{aBMD}) were used as outcomes.

Covariates:

- Co-variables adjusted for in linear regression analyses were maternal ethnicity, pre-pregnancy BMI, smoking, physical activity, mid-gestation 25(OH) vitamin D status and gestational diabetes, along with offspring gestational age at birth, sex and weight on the day of DXA scan.

CONCLUSIONS:

- Breastfeeding for longer than 6 months was associated with lower lumbar spine bone mineral apparent density in young children.
- As society advocates for longer duration of breastfeeding, it may be important to determine interventions to protect bone mineralization in infants through a longer duration of breastfeeding.

Reference: 1. *J Clin Endocrinol Metab.* 1991 Dec;73(6):1332-9. Clinical and anthropometric correlates of bone mineral acquisition in healthy adolescent girls. Katzman DK, Bachrach LK, Carter DR, Marcus R.

RESULTS:

- Malay children and girls had higher lumbar spine BMAD (Figure 1).

Figure 1: Lumbar spine bone mineral apparent density in children by ethnicity and sex

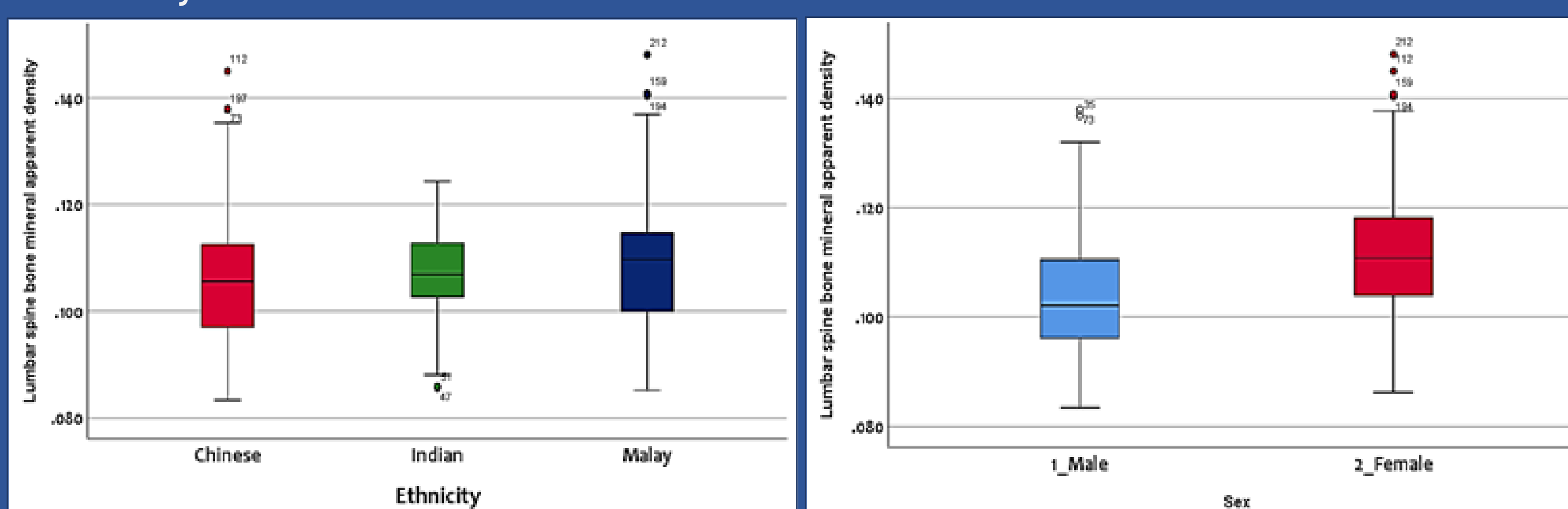


Table 1: Association between duration of breastfeeding and Z scores of lumbar spine bone mineral apparent density in children

Duration of any breastfeeding (BF)	Mean Difference (95% CI)	P
Whole group		
Never BF or BF ≤ 3 month (N=67)	Reference	
BF >3-≤6month (N=29)	-0.072 (-0.458, 0.315)	0.714
BF >6month (N=53)	-0.356 (-0.694, -0.018)	0.039
Sex		
Boys		
Never BF or BF ≤ 3 month (N=30)	Reference	
BF >3-≤6month (N=17)	-0.109 (-0.644, 0.426)	0.684
BF >6month (N=26)	-0.565 (-1.079, -0.052)	0.031
Girls		
Never BF or BF ≤ 3 month (N=37)	Reference	
BF >3-≤6month (N=12)	-0.157 (-0.751, 0.438)	0.600
BF >6month (N=27)	-0.142 (-0.627, 0.343)	0.561

- Compared to children who had never/shorter BF duration (N=67), those who were breastfed longer (N=53) had significantly lower Z_{L-BMAD} and BMAD, β (95%CI) -0.356 (-0.694,-0.018), $P=0.039$ and -0.005 (-0.0089, -0.0002) g/cm^3 , $P=0.039$, respectively.
- The association between BF duration and Z_{L-BMAD} was significant only for boys -0.565 (-1.079, -0.052) g/cm^3 in a stratified analysis.
- The observed associations were independent of level of adiposity of the child.
- However, these associations were non-significant when using lumbar spine aBMD and Z_{aBMD} , highlighting the importance of considering bone size when assessing BMD in children.
- The Z_{L-BMAD} of children were similar between children who had shorter and intermediate BF (N=29) duration.



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