



The Impact of Fetal Malnutrition on Linear Growth and Nutritional Status of Filipino Infants

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Introduction

- Poor intrauterine growth has long-term implications for child growth and development with increased risks for stunting and impaired cognitive development.¹
- The Clinical Assessment of Nutritional Status score (CANSORE) is designed to assess cases of Fetal Malnutrition (FM) at birth, independent of gestational age.²
- There is limited evidence evaluating the CANSORE as a predictor of infant development.
- In a cohort of N=266 newborns from Leyte, The Philippines, we assessed FM as a predictor for anthropometric growth from birth to 24 months of age.

Methods

- Pregnant women were enrolled as part of a longitudinal cohort study, and infants were enrolled into a sub-study at birth and followed for 24 months.
- The CANSORE, which uses 9 superficial signs of malnutrition and ranges from 9-36, was assessed at birth, and FM was defined as CANSORE<25 (Figure 1).
- The WHO ANTHRO package was used to determine the weight-for-age (WAZ), length-for-age (LAZ), and weight-for-length-for-age (WLZ) z-scores based on the WHO Child Growth Standards at 1, 6, 12, 18, and 24-month visits.³
- Associations between FM and anthropometric z-scores were assessed using multivariate linear regression, adjusting for potential confounding factors of prematurity, maternal age, maternal body mass index (BMI), family socio-economic status (SES), and child sex.

CANSORE

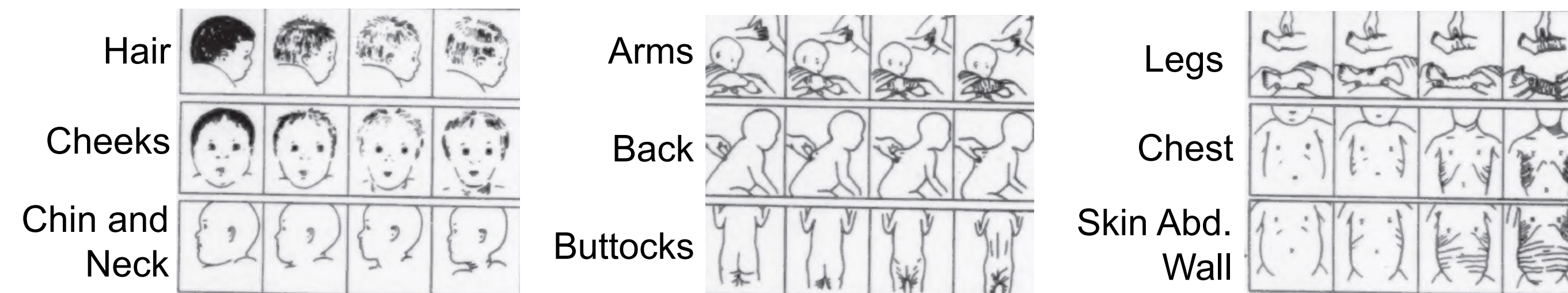


Figure 1. Superficial characteristics used to calculate the CANSORE as outlined by Metcalf.² Images are assigned values of 1-4 moving from right to left and totaled for a score ranging from 9-36.

Results

		Fetal Malnutrition			
		Total (n=266)	Fetal malnutrition (n=8)	No fetal malnutrition (n=238)	P value ¹
Birth Data	N				
Female, n (%)	266	129 (48.5)	5 (62.5)	112 (47.1)	0.48
Male, n (%)	266	137 (51.5)	3 (37.5)	126 (52.9)	
Gestational age, wk	248	39.1 (38.1-40)	38.4 (34.6-39.4)	39.1 (38.1-40.1)	0.116
Small-for-gestational-age, n (%)	248	38 (13.9)	4 (50)	32 (13.4)	0.02
Premature, n (%)	248	27 (10.2)	3 (37.5)	24 (10.1)	0.046
Maternal Data					
Age, y	266	26.8 (23.0-30.9)	26.8 (23.1-30.6)	26.8 (23.3-30.6)	0.91
Body mass index, kg/m2	266	21.9 (19.7-24.3)	20.7 (19.9-22.0)	21.9 (19.6-24.3)	0.34
Socio-econimic quartile, n (%)					
Q1 (highest)	266	71 (26.7)	3 (37.5)	63 (26.5)	0.78
Q2	266	68 (25.6)	2 (25)	59 (24.8)	
Q3	266	70 (26.3)	1 (12.5)	66 (27.7)	
Q4 (lowest)	266	57 (21.4)	2 (25)	50 (21.0)	

Table 1. Basic descriptive data by FM diagnosis. Values reported in Median (IQR) or n (%). ¹P values generated by Wilcoxon rank sum test for continuous variables or Fisher's Exact for categorical variables.

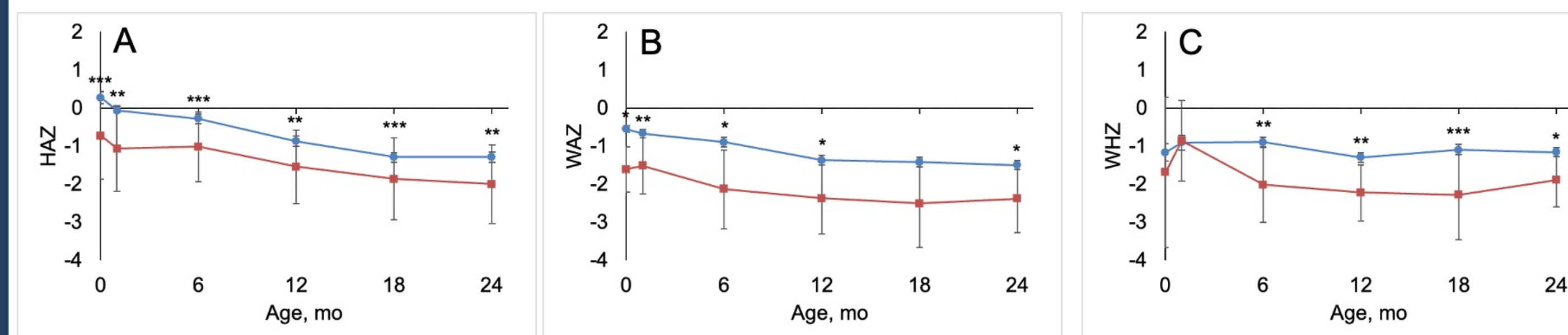


Figure 2. Weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) z-scores from birth to 24 months of age by FM diagnosis (A, WAZ; B, HAZ; C, WHZ). Values are means and 95% confidence intervals, n=266. Blue circles represent no FM diagnosis, red squares represent FM diagnosis. FM diagnosis was defined as a CANSORE<25. *P<0.05, **P<0.01, ***P<0.001 different from FM group.

Results cont.

- Among the N=266 infants included for analysis, 51.5% were male, 10.2% were born premature, and 8 (3%) were classified with FM at birth.
- In fully adjusted models, FM was associated with significantly reduced WAZ, HAZ, and WHZ at nearly all visits.

Conclusions

- FM is associated with poor longitudinal growth outcomes up to two years after birth when compared to non-malnourished infants.
- FM is an independent process from that of SGA and can be missed with current birth assessments.
- These findings contribute evidence for the utility of the CANSORE, which is a no-cost tool that can be applied in low-resource settings.
- Infants with FM do not exhibit catch-up growth in this setting and should have access to fortified formula and high caloric, protein-rich supplementary foods.

References

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