

Impact of Standardised Nutrition Bundle With Exclusive Human Milk Diet on Anthropometric Z-Score Trends in Preterm Neonates $\leq 1000\text{g}$: Interim Analysis of Personalised Enteral Nutrition (PEN) Study



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Background

Preterm neonates $\leq 1000\text{g}$ have high nutrient demands and faltering growth is common, demonstrated by declines in z-scores for weight, length, and head circumference (HC) during their initial hospital stay. In October 2023, a standardised nutrition bundle was introduced in our NICU which included enhancement of NICU dietitian hours, employment of nutrition allied health assistants, standardised enteral feeding protocol and introduction of exclusive human milk diet (EHMD) for neonates $\leq 1000\text{g}$ with an aim to improve growth outcomes. EHMD consisted of human milk fortified with human milk derived fortifier (Humavant, Prolacta Bioscience) until 34 weeks corrected gestational age.

Methodology

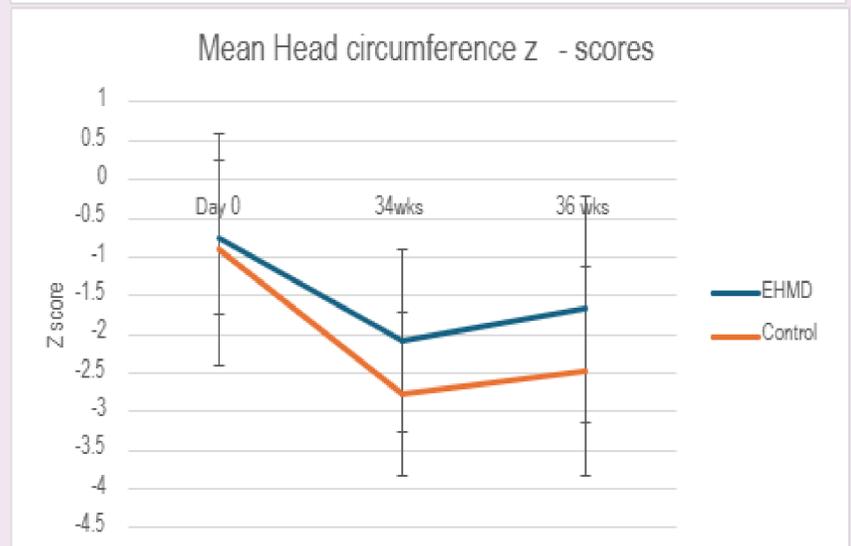
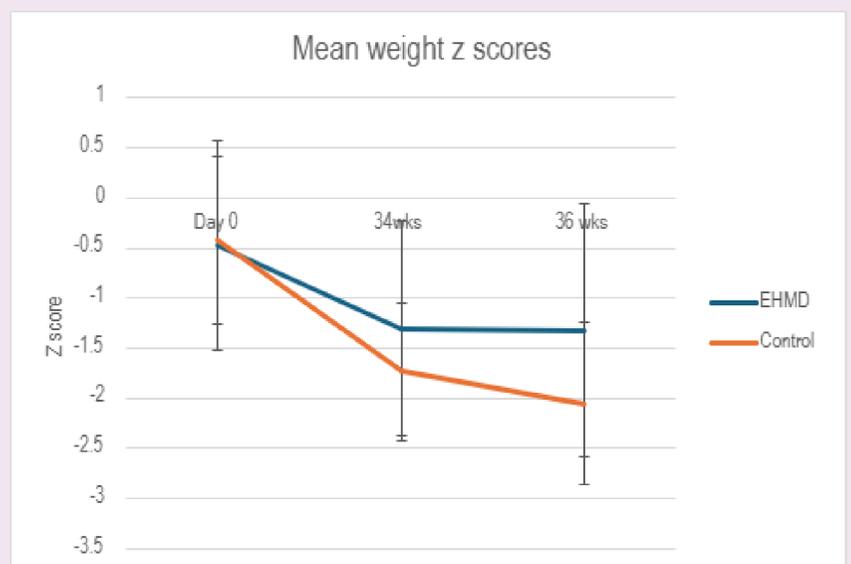
Prospective cohort study with historical controls of inborn infants $\leq 1000\text{g}$. Primary outcome was change in anthropometric z-scores from birth to 36 weeks corrected gestational age (CGA). Mean ($\pm\text{SD}$) are shown.

Characteristic	Control	EHMD
At birth		
Gestational age, weeks	25.94(1.06)	26.43(1.69)
Birthweight, g	757.72(162.70)	792.4(156.8)
Birthweight z scores	-0.42(0.83)	-0.47(1.05)
Length z-scores	-0.93(1.5)	-0.54(1.43)
HC z-scores	-0.91(1.33)	-0.75(0.99)
Interventions		
First enteral feed, hours	8.2(6.4)	5.6(2.1)
Enteral volume (mL/kg/day) at commencement of fortification	138(16)	98(16)
Age at commencement of fortification, days	20.8(11.2)	10.4(5.7)*
Age at enteral volume 150 mL/kg/day, days	20.2(10.4)	12.7(5.6)*
Days on parenteral nutrition (PN)	20.3 (11.2)	12.8(5.8)*
Z score change (Δ) at 36 weeks CGA		
Weight	-1.6(0.8)	-0.9(0.6)*
Length	-2.2(1.4)	-1.6(0.7)
HC	-1.6(0.8)	-0.9(0.8)

*p < 0.05

Results

- The baseline characteristics of both groups were similar.
- EHMD group demonstrated a smaller decline in weight and HC z-scores from birth to 36 weeks CGA (Table 1). See figures
- EHMD group also achieved:
 - earlier commencement of fortification [10.4 (5.7) vs 20.8 (11.2) days, $p < 0.01$]
 - earlier attainment of enteral feeds of 150 mL/kg/day [12.7 (5.6) vs 20.2 (10.4) days, $p < 0.01$]
 - reduced duration of parenteral nutrition [12.8 (5.8) vs 20.3 (11.2) $p < 0.05$].



Conclusions and Recommendation

Nutrition bundle involving EHMD improved growth outcomes in extremely preterm infants during their hospital stay.