RUTGERS HEALTH
Robert Wood Johnson Medical School

Association of Nutritional Status and Child Development in Influenza Patients in an Urban Slum in Dhaka, Bangladesh

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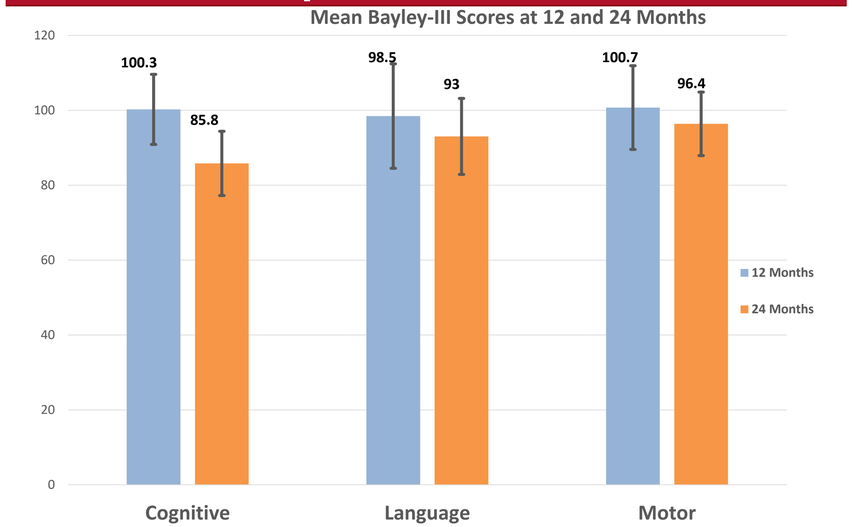
Background

- Many children < 5 years in developing countries do not reach their developmental potential due to multiple risk factors.
- Acute respiratory tract infection is a leading cause of death in Bangladesh.
- Seasonal influenza causes respiratory infections that are a heavy public health burden, making prevention a key goal.
- May be at risk for poorer developmental milestones
- Additionally, undernutrition in itself is a risk factor for poor development.
- **Objective:** To explore if the association of influenza symptoms with child development varied by children's nutritional status via a retrospective cohort study.

Methods

- Families visited at 3-day intervals over a 2-year period.
- Nasopharyngeal secretions were sent for lab testing after each respiratory symptom.
- Bayley scores were recorded at 12 and 24 months to evaluate children's cognitive, language, and motor development.
- Nutritional status was assessed using the WHO classification for infants and children:
  - Normal / mildly undernourished: WAZ≥ -1 SD of median
  - Moderately undernourished: WAZ ≥ -3 and < -2 SD of median
  - Severely undernourished: WAZ < -3 SD of median
- Multiple regression analysis was used for the association of influenza symptoms with children's development and whether nutritional status affected this relationship.

Mean Composite Scores of Developmental Outcomes



Results

- Children suffered from several symptoms including fever (n=341), cough (n=361), chest in-drawing (n=56), and diarrhea (n=25).
- No significant association was found between durations of fever, cough, chest indrawing, and diarrhea and 24-month cognitive scores in all participants or either nourishment group
- Duration of diarrhea was associated with poorer 24-month language scores only among moderately/severely malnourished children.
- Duration of fever was associated with poorer 24-month motor scores among all participants but not after stratification by nutritional status.
- Duration of diarrhea was associated with poorer 24-month motor scores only among moderately/severely malnourished children.

Regression for 24-Month Composite Scores

Cognitive Scores

Covariate*	Duration of fever		Duration of cough		Duration of chest indrawing		Duration of diarrhea	
Nutritional status	Coefficient (95% CI)	P-value	Coefficient (95% CI)	P-value	Coefficient (95% CI)	P-value	Coefficient (95% CI)	P-value
All participants	0.211 (-1.574, 1.995)	0.816	0.096 (-1.495, 1.687)	0.905	-0.674 (-4.55, 3.202)	0.724	0.213 (-2.575, 3.001)	0.878
Normal / mildly malnourished	-0.578 (-2.62, 1.465)	0.577	-0.444 (-2.231, 1.344)	0.624	2.424 (-2.318, 7.167)	0.298	0.671 (-2.682, 4.024)	0.685
Moderately / severely malnourished	3.263 (-0.666, 7.193)	0.415	2.15 (-1.674, 5.974)	0.262	-4.438 (-9.246, 0.37)	0.061	-0.698 (-7.696, 6.3)	0.829

*Adjusted for 12-month score, mother's education, HAZ, asset index

Language Scores

Covariate*	Duration of diarrhea	
Nutritional status	Coefficient (95% CI)	P-value
All participants	-2.574 (-5.236, 0.089)	0.058
Normal / mildly malnourished	-1.032 (-4.402, 2.337)	0.535
Moderately / severely malnourished	**-4.733 (-8.126, -1.34)**	**0.011**

*Adjusted for 12-month score, mother's education, HAZ, asset index

Motor Scores

Covariate*	Duration of fever		Duration of diarrhea	
Nutritional status	Coefficient (95% CI)	P-value	Coefficient (95% CI)	P-value
All participants	**-1.787 (-3.472, -0.101)**	**0.038**	-1.942 (-4.51, 0.626)	0.135
Normal / mildly malnourished	-1.451 (-3.323, 0.420)	0.127	-0.303 (-3.933, 3.326)	0.865
Moderately / severely malnourished	-3.12 (6.939, 0.699)	0.107	**-4.937 (-9.931, -0.001)**	**0.049**

*Adjusted for 12-month score, mother's education, age, HAZ, asset index

Recommendations

- Preventive measures like immunization and reducing environmental pollution have immense value for children's health and development
- Psychosocial stimulation interventions focusing on language and motor development of children following such illnesses may be designed to prevent diarrhea effects in malnutrition
- Further studies with higher samples sizes are required for more conclusive results

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