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RESEARCH ARTICLE

THE ROLE OF NUTRITION IN INTEGRATION OF EARLY CHILDHOOD DEVELOPMENT IN THE 21ST CENTURY

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ABSTRACT

Early Childhood Development (ECD) is a multidimensional process shaped by physical, cognitive, social, and emotional growth, with nutrition playing a central role in determining developmental outcomes. This paper examines the critical influence of maternal and child nutrition during the first 1,000 days and beyond, highlighting how deficiencies, stunting, and poor dietary practices impair neurocognitive abilities, social behaviors, and long-term academic potential. Evidence from neuroscience and longitudinal studies demonstrates that early deprivation alters brain structure and function, while adequate nutrition supports healthy growth and equitable learning opportunities. The discussion emphasizes the importance of breastfeeding, micronutrient sufficiency, and balanced maternal health, while also acknowledging that nutrition alone cannot guarantee optimal development. Social determinants, caregiver mental health, and early stimulation act as mediators that shape outcomes. Interventions integrating nutrition with broader psychosocial and educational support are shown to be more effective than nutrition-specific approaches alone. The paper concludes that achieving sustainable development goals for ECD requires multisectoral strategies that combine nutrition, health, education, and social equity to ensure all children reach their full developmental potential.

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INTRODUCTION

Early child development (ECD) is fundamentally a process of skill development based on physical and neurobiological development that happens in specific socioeconomic and cultural contexts (Black et al., 2015). Child development has multiple dimensions including physical, sensorimotor, social, emotional, language, and cognitive. During the first 5 years of life, children rapidly develop from being unable to speak and walk to having in place fairly advanced motor, social, and cognitive skills. It is well established that maternal–child health and nutrition during the first 1,000 days of life are crucial for helping the child establish a healthy growth. Recent advances in neuroscience have clearly established that the brain develops very rapidly during gestation and the first 2 years of life and that its development continues unfolding between 3 and 5 years of age following a scaffold-like process with new abilities building upon the foundations set by previous acquired abilities (Black et al., 2015; Black et al., 2016). Even though it is widely recognized that ECD is one of the most important predictors of future social capital and national productivity (Doyle et al., 2009), the recently published ECD Lancet Series reports that about 250 million children under 5 years are at risk of not reaching their developmental potential, mainly as a result of poverty and social injustice (Black et al., 2016). So why is this and what will it take to reverse this situation? The purpose of this special issue is to highlight important contributions from the field of nutrition to ECD that have been previously published in our journal and to identify lessons learned from them for better understanding how the nutrition sector can contribute to ECD in the context of multisectorial interventions. Given the centrality of ECD indicators as part of the 2015–2030 sustainable development goals, we indeed hope that this special virtual issue will offer important insights toward understanding what will it take to achieve the ECD sustainable development goals. In the selection of papers included, we gave priority to papers published within the last 2 years (to provide a sense of where the field stands) and also to those that help understand complex nutrition–ECD relationship, have tested innovative interventions, or that have generated interesting hypotheses that can influence future research in the field.

Early Deprivation Affects the Growth and Changing Structure and Function of the Brain: Research from neuroscience helps explain why experiences during infancy and early childhood, are so critical for health, social adjustment and well-being. Neuroscience renews the

imperative to ensure high-quality ECD for every child, from before birth onwards.

Inequalities emerge – and are best prevented – early in life: The link between poverty, child development outcomes and widening inequalities is well known. Early deprivations impact cumulatively on children's long-term outcomes. For example, one multi-country study showed that for every 10% increase in levels of stunting among children, the proportion of children reaching the final grade of school dropped by almost 8%.

Early child development programmes are cost-effective: Economic analysis adds to the weight of evidence that ECD is not only critical but also cost-effective. Life-course evidence demonstrates the returns to children and society through, for example, reduced costs of special education, reduced social protection costs, higher earnings, etc.

The first three years matter too: The investment potential of ECD is not just about 'pre-primary' and school readiness. Systematic studies across diverse contexts, sectors and delivery platforms show that the biggest returns may come from programmes targeted towards the very youngest children and parents.

The importance of ensuring programmes is targeted, equitable and inclusive: One of the biggest challenges for scale-up is to reach the poorest, most remote and marginalized children. Indeed, one of the reasons poorer children lose out in their later learning outcomes may be because they are attending poorer quality pre-primary and primary schools than their better-off peers.

Nutrition and Child Development across the Life-Course: Aubuchon-Endsley et al. (2016) found that maternal pre-pregnancy obesity combined with excess weight gain during pregnancy was associated with poorer neurobehavior in neonates including poorer regulation, lower arousal, and higher lethargy. Potential confounders, such as delivery complications or early medial difficulties, were not found to influence the interaction between maternal weight and infant neurobehavior. Rather the authors suggest that excessive maternal weight and gestational weight gain may program infant neurobehavioural development via hormonal pathways such as dysregulation of the hypothalamic– pituitary–adrenal axis. The importance of breastfeeding on ECD is widely acknowledged in the literature. Adding to the debate about the specific mechanisms by which breastfeeding improves ECD, Huang, Vaughn, and Kremer (2015) conducted a prospective study to further investigate the nurturing hypothesis (i.e., that breastfeeding acts as a proxy for family socioeconomic background and parenting behaviors) on the link between breastfeeding and ECD. They found that the positive association between breastfeeding and academic ability at 12 years of age was independent of socioeconomic status and parenting behaviors. Further, the associations between breastfeeding with children's behavioral problems were divergent from those of family socioeconomic characteristics and parenting behaviors, suggesting that the mechanisms behind the observed relationship between breastfeeding and ECD is likely to be different from those by which family socioeconomic background and parenting exert their effects. Their findings therefore question the hypothesis that the relationship between breastfeeding and improved child development is spurious and totally confounded by socioeconomic status and parenting approaches. Under nutrition has long been associated with poor developmental outcomes in children, but there have been few longitudinal studies that have investigated this relationship. In an attempt to address this knowledge gap, Crookston et al. (2011) assessed the relative impact of early stunting (stunted at 6–18 months of age) and concurrent stunting (stunted at 4.5–6 years of age on the cognitive ability of Peruvian children participating in the Young Lives cohort study. Factors found to put children at greater risk of poor cognitive development included poverty, living in a rural environment, low maternal education and age, more siblings, and failure to attend pre-school. Notably, concurrent stunting was found to have a greater impact on cognitive skills than early stunting. This finding indicates that it is important to address stunting throughout the first 5 years and not just during the first 1000 days of life. Teivaanmäki et al. (2016) found in their cohort study conducted in Malawi that improved height gain between two and 15 years of age, but not between birth and two years of age, was independently associated with cognitive development. Consistent with Crookston et al. (2011), this study strongly suggests that promoting linear growth post-1,000 days is very important for long-term cognitive development and policy. Although these studies add to the increasing body of knowledge indicating that poor nutritional status during early childhood and beyond has a negative impact on cognitive development, few have investigated the association between nutritional status and social behaviors and what the potential mediators may be. Liu and Raine (2016) found in a large sample of 3-year-old children living in Mauritius that malnourished children had impaired social functioning, which exhibited a dose– response relationship whereby increased malnutrition was associated with more impaired social behavior.

Neurocognitive ability was found to mediate the nutrition–social behavior relationship. This suggests that malnutrition predisposes children to poorer neurocognitive functioning, which in turn predisposes them to reduced positive social behavior. These findings help illuminate the complex web of relationships that help explain the dire consequences that malnutrition has for multiple human development dimensions including cognitive abilities and social skills. It is well established that deficiencies in specific micronutrients, such as iron and iodine, have long lasting detrimental effects on child development. There has been increasing interest in the role of other nutrients, such as fatty acids, zinc, and vitamin B12, on child cognitive development. Findings from studies investigating the association between individual nutrient levels and supplementation on ECD however remain inconclusive. In their review of the impact of fatty acids on growth and neurobehavioural development in infants, Makrides and colleagues confirmed that the effect of maternal supplementation on global neurobehavioural outcomes for children born at term remains unclear, although omega-3 Long-Chain Polyunsaturated Fatty Acids (LCPUFAs) supplementation of women expressing milk for their preterm infants does appear to improve their performance on tests of global neurodevelopment (Makrides et al., 2011). Likewise, two observational studies published in Maternal and Child Nutrition failed to find convincing evidence of enhanced infant psychomotor or cognitive development related to the LCPUFA content of breast milk or infant DHA status (Engel et al., 2013; Keim et al., 2012). Two micronutrient randomized controlled

trails (one maternal vitamin B12 supplementation trial of mothers, the other zinc supplementation of infants) were also unable to provide evidence of a positive effect on ECD (Locks et al., 2016; Srinivasan et al., 2016), suggesting that nutrition silver bullets simply do not exist to improve ECD.

Social and Behavioral Mediators: Maternal postnatal depression has been found to affect maternal– infant interactions and is associated with poor cognitive, emotional, and behavioral outcomes in children. Mallan et al. (2015) found in the Australian prospective NOURISH trial that maternal postpartum depression, assessed at 4 months postpartum, had a negative association with the mother's ability to feed responsively of 2-year-old children (i.e., greater pressure to eat, restrictive feeding style, and emotional feeding). It has been suggested that such practices may undermine child self-regulation of intake and could be associated with obesogenic eating behaviors and increased risk of overweight. These findings highlight the strong links between the mental health of the caregiver and the feeding behaviors of very young child, which is the age when food preferences and long-term dietary habits get established. Thus, addressing postpartum depression should be considered as part of multi-focal young child nutrition programs.

Interventions: Interventions to improve nutritional status of young children may have the added benefit of improving ECD in low-and middle-income countries. Larson and Yousafzai (2015) concluded from their meta-analysis that the mental development of children under 2 years in low- and middle-income countries is more strongly influenced by their motor development than their growth status resulting from postnatal nutrition interventions. It is crucial that these important findings are noted by the nutrition community who traditionally have expected growth to be the strongest mediator between nutrition interventions and cognitive outcomes in children.

CONCLUSIONS

Improving ECD is crucial for meeting the 2015–30 Sustainable Development Goals. The collection of papers presented in this special issue of Maternal & Child Nutrition collectively indicates that although nutrition-specific interventions are essential for child development, they are not sufficient in and by themselves for children to reach their full developmental potential. This is because many non-nutrition factors —including the social determinants of health, parenting style, and early childhood stimulation—affect both nutritional status as well as other dimension of ECD including psycho-emotional, cognitive, and academic development. Indeed, nutrition silver bullets simply do not exist to improve ECD and intersectoral multi-level programs that are needed to address child development challenges.

REFERENCES

Aubuchon-Endsley, N., Morales, M., Giudice, C., Bublitz, M. H., Lester, B. M., Salisbury, A. L., & Stroud, L. R. 2016. Maternal pre-pregnancy obesity and gestational weight gain influence neonatal neurobehaviour. Maternal & Child Nutrition. DOI:10.1111/mcn.12317

Black, M.M., Walker, S.P., Fernald, L.C.H., Andersen, C.T., DiGirolamo, A.M. 2016. The Lancet Early Childhood Development Series Steering Committee. Early child development coming of age: Science through the life-course. Lancet. In Press.

Black, M. M., Pérez-Escamilla, R., & Rao, S. F. 2015. Integrating nutrition and child development interventions: Scientific basis, evidence of impact, and implementation considerations. Advances in Nutrition, 6(6), 852–859. Britto, P., Lye, S., Proulx, K., Yousafzai, A., Matthews, S., Perez-Escamilla, R., …

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