

The link between nutrition and children's development and behavior has been a topic of interest for over 40 years. Initially investigators focused on protein-energy malnutrition (PEM), caused by a lack of calories. Undernourished children were described as lethargic, apathetic, and inactive, with poor performance on measures of cognitive function [8]. Advances in the areas of growth, nutrition, animal research, behavioral neuroscience, and child development have influenced recent investigations of nutrition and children's development in ways that extend far beyond PEM [4]. Benton's [2] paper illustrates how far the field has evolved in examining how nutrients and foods are related to children's cognition and behavior by altering either the structure or function of the brain.

Guided by findings from animal research that nutritional deprivation can lead to structural and functional changes in the developing brain [1, 5], investigators have used a variety of assessment tools, including intelligent tests and ratings of performance or social-emotional behavior, to determine whether nutritionally deprived children recover or experience long-term consequences. The paper by Isaacs and Oates [6] provides a comprehensive review of the methods that are available to measure cognitive performance and assess competence in children, showing the importance of selecting assessment tools that are psychometrically sound and sensitive enough to detect expected effects, which are often subtle. The paper also stresses the need to consider carefully the specific cognitive processes that are the focus of interest and to choose appropriate assessment tools these.

Associations between nutrition and child development and behavior have also been informed by the recognition of the role that micronutrients play in

promoting healthy growth and development. Micronutrients are nutrients that are used by the human body in small quantities. They are not produced by the body and must be acquired through diet, fortification, or supplementation. Benton's [3] paper provides a comprehensive review of the associations between micronutrients and behavioral problems in children.

In addition to direct effect models whereby nutrition alters children's brain development and function, investigators have also been examining indirect effect models, including moderating and mediating models. In moderating models, the effects of nutrition vary across characteristics of families or children. For example, families who are poorly educated with poor decision-making skills may have more difficulty protecting their children from the effects of nutritional deprivation than families who are better educated with rational decision-making skills. In mediated models, the effects of nutrition are felt through disruptions in family functioning, which in turn have negative repercussions on the children. For example, functional isolation theory posits that in addition to the direct effects of nutritional deprivation on brain functioning, parents may react to children's poor growth and lethargy by limiting opportunities for learning and stimulation [7]. This process creates a double jeopardy in which children experience the direct effects of poor nutrition and the indirect effects of limited opportunities.

This group of papers illustrates the evolving sophistication that has occurred in understanding the associations between nutrition and children's development and behavior over the past 40 years. In addition to providing direction for further research, the findings may also inform policies related to children's nutrition and diet.

References

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