

Complementary Feeding in an Obesogenic Environment: Behavioral and Dietary Quality Outcomes and Interventions

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The WHO infant feeding guidelines are prescriptive, largely based on the outcomes of exclusive breastfeeding and have a bias to undernutrition [1]. Little attention has been paid to outcomes (independent of exclusive breastfeeding) of complementary feeding (CF) practices relevant to food preferences and eating behaviors/patterns that are potentially protective in the excess food environment of affluent countries [1].

Complementary feeding comprises a number of interrelated exposures: timing (initiation and rate of progression); type of food (nutrients, taste and texture); process (repeated exposure, variety and self-feeding), and parent feeding practices [control, (non)responsive feeding and structure] [2]. To date, the focus has been on the exposures of timing (when) and nutrients (what) and relatively short-term outcomes (growth rate, infection, micronutrient status, atopy and infant mortality). However, in the context of an obesogenic environment, it is important to consider longer-term outcomes that potentially mediate the associations between infant feeding and life-long eating patterns and obesity and chronic disease risk [3, 4]. These ‘intermediate’ outcomes do not only include rapid growth but also taste preferences, food acceptance and texture tolerance, which are key determinants of early dietary variety and hence quality. However, studies examining the independent impact of the ‘when, what and how’ of CF are scarce.

Many correlational studies have suggested that infant feeding practices ‘program’ taste preferences, texture tolerance and appetite regulation at a time when both behavior and biology are plastic. A seminal 2008 review [5] of studies examining the role of feeding practices in child eating behavior and weight status reported there were only 6/67 longitudinal studies, 2 small interventions and no studies that commenced in infancy. The NOURISH intervention and trial were designed around this time to address this gap [6].

The NOURISH trial [6, 7] evaluated a CF intervention for first-time mothers commencing at infant age 3–6 months. The overall research question was *Can anticipatory guidance increase 'protective' feeding practices that support development of healthy child eating behaviors, food intake and growth?*. The trial allocated 698 mothers with healthy term infants. Outcome assessment occurred at ages 4 months (baseline), 14 and 24 months, and 3.5 and 5 years (3.5 years after intervention). The intervention comprised two modules, each of six fortnightly group sessions, that commenced at child age 4 and 14 months. Messages emphasized healthy growth and eating behaviors rather than obesity prevention. Overall, NOURISH demonstrates that anticipatory guidance on the process of CF increased protective maternal feeding practices and was associated with trends ($p = 0.06$) in obesity risk reduction >3 years after intervention. The impact on dietary quality, food preferences and child eating behavior was limited. NOURISH was a universal intervention with participants enrolled regardless of obesity risk. Targeting infants with genetic or phenotypic risk may enhance the impact of anticipatory guidance during CF [7]. The Early Prevention of Obesity in Childhood (EPOCH) collaboration provides an individual participant data prospective meta-analysis of individual data from four feeding trials commencing before 6 months age, including NOURISH [8]. Analysis ($n = 2,196$) showed a significant intervention effect at 2 years of age on BMI z-score (-0.12 , $p = 0.017$, adjusted for baseline) [9].

There is a clear need for better evidence to inform affluent country guidelines on the 'when, what and how' of CF based on outcomes relevant to obesity and chronic disease risk. Mothers, most of whom do not exclusively breastfeed to 6 months, need clear and consistent advice on continuing any breastfeeding for as long as possible, safe and appropriate bottle feeding (e.g. avoiding encouragement to empty the bottle) and introducing solids in a way that promotes increased acceptance of a wide range of foods and textures (e.g. repeated, varied exposure and early texture progression). There needs to be less political correctness related to exclusive breastfeeding and more research on optimizing the timing and process of CF.

References

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