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REVIEW

Complementary feeding in the MENA region: Practices and challenges

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Abstract Suboptimal feeding patterns during the first two years of life are key determinants of malnutrition in children and constitute an important predictor of health in later years. Early-childhood nutritional factors, stunting, and obesity have been highlighted as prominent core underlying factors of Non-Communicable Disease (NCD) development whereas the improvement of complementary feeding practices has been cited as one of the most effective preventive strategies for reducing malnutrition and adult NCDs. In the MENA region NCD prevalence shows very high rates and the limited available studies show that current practices fall behind global recommendations.

Common to all countries of this region are practices of mixed breast and bottle-feeding as early as the first month, as well as the premature introduction of complementary foods. Early introduction of non-milk fluids, such as sweetened water and herbal teas, has been described as a common practice in the region and the premature introduction of complementary foods has been reported in as high as 80% of infants in several of the countries. Thus, enhancing infant/young child health can significantly reduce morbidities and mortalities, as well as adult-onset diseases, ultimately decreasing the region's overall burden of disease.

Background

Appropriate, adequate and timely nutrition during infancy and early childhood (between 0 and 2 years of age) constitutes a critical window of opportunity to ensure proper growth and development [1]. Inadequate feeding in the first years of life could lead to malnutrition which has been shown to be associated with short-term adverse consequences such as retarded growth and increased child morbidity and mortality in addition to increased risk of adult Non-Communicable Diseases (NCD) [2]. It is estimated

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that 60% of all under-five childhood mortality is directly or indirectly related to malnutrition. Retarded growth in infancy is reflected in a failure to gain weight (wasting), or a failure to gain height (stunting). Stunting is an important predictor of child development and has been associated with reduced cognition and school performance leading to reduced economic productivity and income earning capacity in adulthood [3]. Stunting has been also linked to trans-generational effects resulting in small babies [4].

In addition to its effects on growth and development, the influence of early nutrition on traditional health outcomes in adulthood has been well established over the past decades, mainly in terms of effects on linear growth and on mental development and educational performance [5]. Moreover, recent epidemiological, observational and experimental studies suggest that early nutrition and feeding practices constitute an important determinant of other health outcomes related to increased prevalence of risk factors for chronic diseases later in life such as diabetes, obesity, cardiovascular diseases, hypertension and cancer. A review of the association between childhood growth and chronic disease in countries undergoing nutrition transition showed that growth failure in early childhood followed later by excessive weight gain is associated with increased prevalence of risk factors for chronic diseases in late adolescence or early adult life [6].

Recent estimates of the burden of malnutrition in developing countries indicate that despite under-nutrition dominating the nutritional status of under-five children in the MENA region, some countries are experiencing a double burden of malnutrition whereby stunting is coupled with a prevalence of overweight exceeding 10%, reaching as high as 25% in Egypt [7], 15% in Morocco, and 20% in Syria [8].

As malnutrition in young children is frequently brought about by lack of quality food and deficient care, improving the quality of complementary foods has been cited as one of the most effective preventive strategies for improving health and reducing morbidity and mortality in this vulnerable group. Recent estimates indicate that nearly 20% of under-five deaths in developing countries could be prevented by a combination of exclusive breastfeeding for 6 months and optimal complementary feeding practices [9].

This paper reviews the importance of complementary feeding in disease prevention and highlights current complementary feeding practices in the MENA region while providing recommendations on steps to be taken toward relevant public health intervention.

Importance of complementary feeding in disease prevention

After six months of age, milk is no longer sufficient to meet the nutritional needs of growing infants, increasing therefore the risk of under-nutrition [10,11]. Although studies concur that young children require foods that are both energy and nutrient rich, and despite there being a consensus on the types of foods recommended during the transitional period from breast milk/formula to complementary foods, controversies as to the optimum time for introduction of complementary feeding still exist. While the European Society of Pediatric Allergy and Clinical Immunology (ESPACI) and the European Society of Pediatric Gastroenterology (ESPGHAN) recommend that complementary feeding be initiated between 4 and 6 months of age and preferably should not be delayed beyond 26 weeks [11], the WHO, American Academy of Pediatrics (AAP) and the United Nations Children's Fund (UNICEF) recommend the introduction of complementary foods at the age of six months [10,12]. The progressive introduction of complementary foods and how this period of significant dietary change influences health and development in later years is under thorough investigation.

There is accumulating evidence that metabolic events during the critical time of pre- and post-natal development have marked modulating effects on adult health, a concept coined by Dörner more than 20 years ago and advanced more recently by Barker's insightful studies [13]; this hypothesis is often referred to as *programming* or *metabolic programming* [14]. The metabolic events during pre and post-natal development have been shown to be affected to a large extent by early nutrition. Therefore, adequate and timely complementary feeding practices not only modulate growth and functional development of a young child, but also appear to play a pivotal role in lifelong programming effects that modulate health, disease, mortality risks, neural function and behavior, and quality of life in adulthood [14—17]. It has been postulated that very early introduction of complementary foods increases the risk of obesity and cardiovascular disease (CVD) later in life [18]. A prospective birth cohort study by Harvard scholars in Boston, Massachusetts has shown that the early introduction of foods, to bottle fed infants before the age of 4 months, increases the odds of obesity at the age of 3 years by six-fold [19] and a review of the literature has demonstrated no added benefit of introducing solid foods to infants before the age of 6 months [20]. Similarly, other studies showed no benefits associated with introducing complementary foods between 4 and 6 months of age (though no risks were associated either) [21]. Furthermore, studies have highlighted the benefits of delaying solid food introduction until 6 months of age, revealing lower incidences of diarrheal disease [22], and better growth patterns [23].

Review of practices in the MENA region

Similar to many developing countries, the MENA region is undergoing an unprecedented nutritional and demographic transition, with a wide shift in disease burden [24]. Malnutrition remains the most serious health problem and is the single biggest contributor to child mortality; with15% of the global burden of newborn and child mortality occurring in countries of the region [25]. While problems of under-nutrition still exist, the burden of overweight, obesity and diet-related chronic diseases is increasing at an alarming rate, such that the burden of disease associated with inadequate nutrition is continually growing in countries of the MENA region [24]. As infants and young children are most vulnerable to the development of nutritional problems than other groups; infant feeding practices and infant/young child nutritional status play a pivotal role in gearing the nutritional situation in the region.