



MATERNAL NUTRITION IN EMERGENCIES

Summary of the state of play and key gaps

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Acronyms

AA	Arachidonic Acid
AIDS	Acquired Immune Deficiency Syndrome
ALA	Alpha Linolenic Acid
ANC	Ante Natal Care
BCC	Behaviour Change Communication
BMI	Body Mass Index
BMS	Breast Milk Substitutes
BSFP	Blanket Supplementary Feeding Programme
DHA	Docosahexaenoic Acid
DHS	Demographic and Health Survey
EC	European Commission
ECHO	European Commission Humanitarian Office
EFA	Essential Fatty Acids
ENA	Emergency Nutrition Assessment
FANTA	Food And Nutrition Technical Assistance
FAO	Food and Agriculture Organisation
GBV	Gender Based Violence
GFD	General Food Distribution
Hb	Haemoglobin
HIV	Human Immunodeficiency Virus
HTP	Harmonised Training Package
IASC	Inter Agency Standing Committee
IFE	Infant Feeding in Emergencies
IPTp	Intermittent Preventive Treatment in pregnancy
IYCF	Infant and Young Child Feeding
LA	Linoleic Acid
LBW	Low Birth Weight
LNS	Lipid-based Nutritional Supplement
LSHTM	London School of Hygiene and Tropical Medicine
MAM	Moderate Acute Malnutrition
MDG	Millennium Development Goal
MICS	Multi Indicator Cluster Survey
MMN	Multiple Micronutrient
MN	Micronutrient
MNP	Multiple Micronutrient Powder
MUAC	Mid Upper Arm Circumference
NEC	Nutrition Education and Counselling
PLW	Pregnant and Lactating Women
PMTCT	Prevention of Mother To Child Transmission
PUFA	Polyunsaturated Fatty Acid
RUTF	Ready to Use Therapeutic Food
SAM	Severe Acute Malnutrition
SFP	Supplementary Feeding Programme
SGA	Small for Gestational Age
SP	Sulfadoxine-pyrimethamine
SUN	Scaling Up Nutrition
TSFP	Targeted Supplementary Feeding Programme
UN	United Nations
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children's Fund
UNSCN	United Nations Standing Committee on Nutrition
VAS	Vitamin A Supplementation
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organisation

1. SCOPE OF THE REVIEW

This technical background paper was commissioned by ECHO (through the INSPIRE consortium) to inform a technical round table, held in Brussels in November 2013. A literature review was conducted to identify important research, global reviews, policy and guidance documents from a range of global actors (donors, UN and key International NGOs) in the area of maternal nutrition. Search facilities; Google and PubMed were used and additional published work and some limited grey literature was sought through the authors and ECHO's network of colleagues and contacts.

While every effort was made to find all available literature relating to maternal nutrition, given the scope of the review it is possible that some literature has been missed. In particular the review did not aim to capture data from individual programme evaluations or the full range of NGO guidance in the area of maternal nutrition in emergencies. Due to the time constraints of this work the focus was on maternal undernutrition; published work discussing the issues of maternal obesity were therefore not reviewed or addressed. Additionally, maternal nutrition in the context of high HIV infection rates was looked at only briefly.

2. BACKGROUND

Current evidence underlines the importance of the nutritional status of women at the time of conception, during pregnancy and through lactation as a crucial factor in the survival, healthy growth and development of her children (Save the Children 2013) (Lassi et al 2013a). Although it is the subject of less global attention, maternal nutrition is also crucial for women's own ability to live a healthy life.

Maternal mortality rates have remained virtually unchanged in much of Africa for the last two decades, with only modest gains being made in parts of South Asia (Mason et al 2012). Accelerated interventions and stronger political backing for women and children has been called upon to reach the MDG maternal mortality target (UN 2013). Research indicates that the timing of maternal mortality is clustered around labour, delivery, and the immediate postpartum period, with obstetric haemorrhage being the main medical cause of death (Ronsmans & Graham 2006). Programme efforts and operational research on the prevention of maternal deaths, have therefore focussed on improved access to effective antenatal care for the early identification of at-risk pregnancies (Carroli et al 2011) (Lassi et al 2013a) and on improving emergency obstetric care (Chowdhury et al 2007), with some documented results. While malaria and HIV/AIDS are recognised as important indirect causes, the maternal mortality literature (including the *Lancet* series on maternal mortality in 2006) makes little reference to nutritional status. Despite this, as will be seen below, evidence does support the link between maternal nutrition and maternal mortality as well as broader measures of women's wellbeing. It also illustrates the role that women's nutritional status and wellbeing has on the survival, healthy growth and development of the foetus and infant.

The European Commission (EC) has stated that maternal nutrition is an important area both in its own right (i.e. supporting women's own rights to nutrition and health), as well as being a key component for the prevention of undernutrition in infants (EC 2013a, EC 2013b). The EC is committed to building political commitment for nutrition, scaling up both direct and nutrition sensitive actions and strengthening the expertise and knowledge base for nutrition (EC 2013a). Specifically in the humanitarian context, the Commission's support is aimed at treating, preventing and alleviating the short-term consequences of maternal and child undernutrition, by addressing immediate and underlying causes at the individual and household levels (EC 2013b). For maternal nutrition, the Commission is concerned that there are a number of gaps at policy and practice levels and limited guidance is available, in order to efficiently and effectively address the needs for maternal nutrition.

This technical background paper aims to summarise current evidence, on what is required to support maternal nutrition in general and where the gaps in knowledge are in addressing maternal undernutrition in emergencies. The paper aims to focus on support for maternal nutrition in its own right (an area that appears to be neglected in current policy and programming), as well as for the objective of improved infant and child survival, growth and development. The paper takes the approach that improving nutritional status can be achieved in a number of ways, not all of which require a change in consumption, and therefore it attempts to review a broad set of nutrition, health and other sector interventions.

3. WOMEN AND NUTRITIONAL VULNERABILITY

Women are particularly vulnerable to undernutrition from a physiological point of view due to their increased nutrient requirements for menstruation, pregnancy, childbirth and lactation. In particular during pregnancy and lactation, women's nutritional needs for energy¹, protein² and micronutrients³ significantly increase (WHO/UNHCR/UNICEF/WFP 2000)(WHO 2013a).

3.1 Background vulnerabilities

Recent review of evidence (Black et al 2013) indicates that maternal nutrition is of great concern in many countries, many of which experience the most frequent humanitarian emergencies⁴. For example in Africa and Asia, the prevalence of underweight (using BMI⁵<18.4) of adult women is over 10%, Anaemia (Hb <110g/l), which may be attributed to low consumption or absorption in the diet, high levels of parasitic infection, or to blood loss, is also highly prevalent during pregnancy (around 20%). Vitamin A deficiency (serum retinol <0.70µmol/L) rates are extremely high (18.4% in Asia and 14.3% in Africa). In addition 28.5% of the world's population are iodine deficient and it is estimated that iodine requirements are increased by 50% during pregnancy. Every year worldwide, neural tube defects develop in about 300,000 pregnancies and an adequate folic acid intake before and during early pregnancy would lower the incidence of those defects by 50% to 70% (WHO 2012). Finally, an estimated 55 million adult women in developing countries are stunted as a result of undernutrition during childhood (Save the Children 2013). These deficiencies all have implications for the health and mortality of women and of their children (see section 3).

Recent evidence from a multi-country study⁶ (Arimond et al 2011), indicates that there are substantial gaps between micronutrient intakes and requirements for women of reproductive age in diverse resource poor settings; both rural and urban. Gaps between intakes and requirements extend beyond the few micronutrients that are the usual focus of supplementation programmes and are most pronounced for lactating women. A review of the fatty acid status for infants and young children in low income countries (Briend et al 2011) also revealed some interesting findings. It concluded that intake of essential fatty acids (EFA) (see box 1), in particular of specific omega-3 long-chain polyunsaturated fatty acids(PUFA) is likely to be suboptimal; in situations where maternal diet and complementary foods contain little or no fish, and/or, common sources of fat have a low alpha-linolenic acid (ALA) and high linoleic acid (LA) content. These sources of fat include; sunflower, safflower, corn, peanut and soy oils, which are frequently used in many low-income countries. A recent expert consultation (FAO 2011) confirmed the critical role of the fatty acid docosahexaenoic acid (DHA) (see box 1), in the development of the central nervous system of the foetus and young infant, and as an important component of breast milk. Maternal intake of DHA has been shown

¹ Pregnant women require an additional 285 kcal/day and lactating women an additional 500 kcal/day

² Pregnant women require an additional 7.1g/d and lactating women an additional 18.9g/d

³ Adequate intake of iron, folate, vitamin A and iodine are particularly important for the health of women and their infants

⁴ Global Humanitarian Assistance report 2012. Development Initiatives. http://www.globalhumanitarianassistance.org/wp-content/uploads/2012/07/GHA_Report_2012-Websingle.pdf

⁵Body Mass Index - weight (in kilograms) over height squared (in centimetres)

⁶Collected as part of the 'women's diet diversity project' a collaborative research project set up by FANTA in 2005 in order to improve quality and comparability of dietary measures for women

to be directly correlated to its concentration in breast milk and consequently to infant status. Requirements for these fats are therefore considerably increased during pregnancy and lactation.

Box 1: Essential Fatty Acids

Fatty acids that are required by the human body but cannot be made in sufficient quantity from other substrates and therefore must be obtained from food are called essential fatty acids. Only two fatty acids are known to be essential for all humans to ingest through the diet: alpha-linolenic acid (ALA), and linoleic acid (LA). In addition, while docosahexaenoic acid (DHA), an omega-3 fatty acid and arachidonic acid (AA), an omega-6 fatty acid, can be synthesized from these two essential fatty acids in the body, the limited and highly variable nature of this process during early development means that DHA and AA should also be considered essential (i.e. must be ingested in sufficient quantities in the diet) for the first 6 months of life (FAO 2011).

Approximately 20-30% of women in developing countries suffer from mental health problems during pregnancy or following childbirth (WHO 2008), which can in turn, lead to difficulties with infant feeding and child care. Maternal depression has been linked to insufficient intake of EFAs during the perinatal period⁷ (Freeman et al 2008, Su et al 2008).

Almost half of mothers are married before the age of 18 in less developed countries. Pregnancy for these adolescent mothers occurs while they are still growing themselves; which leads to negative consequences for their own nutritional status, compromises the birth weight of their infant (UNSCN 2009) and can lead to complications during childbirth. It is estimated that 70,000 adolescent deaths occur annually from complications from pregnancy and childbirth (UNFPA 2013).

Some research in the African context also indicates that incidence of low birth weight (LBW⁸), in particular small for gestational age (SGA⁹) births, follow seasonal patterns; fluctuating in parallel to seasonal hunger gaps and decreases in maternal weight. In contrast, peaks in incidence of preterm births were found to closely track increase in agricultural labour and malaria infection (Rayco-Solon et al 2005).



⁷Describes the period surrounding birth, and traditionally includes the time from foetal viability from approximately 24 weeks of pregnancy up to either 7 or 28 days of life.

⁸Defined as infants born at term (gestational age of 37 weeks or more) but whose birth weight is <2.5kg at birth

⁹Weight below the 10th percentile for the gestational age

KEY POINTS - Background Vulnerabilities

- Women are particularly vulnerable to undernutrition from a physiological point of view due to their increased nutrient requirements, for both their own development and their reproductive role;
- Evidence indicates that maternal undernutrition is of great concern in many countries, many of which experience the most frequent humanitarian emergencies;
- Globally underweight, stunting, anaemia and vitamin A deficiency rates are extremely high in women of reproductive age; prevalent iodine deficiency also creates considerable problems both for the mother and for the healthy development of her infant;
- Substantial gaps have been reported between micronutrient (MN) intakes and requirements for women of reproductive age in diverse resource poor settings, which are not currently well addressed through supplementation programmes;
- Evidence is growing of the critical role that intake of essential fatty acids has in the development of a healthy foetus and for maternal mental health and wellbeing;
- Early marriage and pregnancy during adolescence is particularly worrying as it occurs while the girls are still growing themselves, interfering with their own growth patterns and increasing the risk of obstetric complications.

3.2 Vulnerabilities in the humanitarian context

Although women are not necessarily more at risk of mortality in the humanitarian context than men, the background vulnerabilities outlined above affect the resilience of women, in particular to shocks. Fluctuations in seasonal factors may well be exaggerated in emergencies, for example an extension of the 'usual' hunger gap, which can magnify any nutritional effects. In addition, a number of factors (detailed below) can lead to increased nutritional vulnerability of women in humanitarian contexts and/or negative effects on their care giving roles.

Increased requirements and reduced intakes

- When food is in short supply, women and girls are more likely to reduce (either voluntarily or not) their intake in favour of other household members. This is particularly critical for pregnant adolescent girls, who must meet their own nutritional needs for growth as well as the needs of the developing foetus.
- Activities such as cultivation and collection of food, firewood and water which women were undertaking pre-crisis, may become more time consuming and require movement over greater distances. Women also undertake additional activities during crises, such as farm work, particularly where male heads of households are absent. This increased labour not only raises their daily requirements, but can also negatively change or disrupt infant and young child feeding practices and child care.
- Micronutrient deficiencies can easily develop or be exacerbated during an emergency. Fortified foods provided as part of food rations during emergencies (fortified blended flours, vegetable oil enriched with vitamin A, iodized salt), may not fully meet the needs of pregnant and lactating women (PLW) (WHO/UNICEF/WFP 2006). Some traditional food sources may also be lost and requirements may increase due to malabsorption and nutrient losses, caused by diarrhoeal and infectious diseases.
- The essential fatty acid profile of women's diets may also change during emergencies as a result of the loss of certain traditional food sources (for example, fish).

Increased risks

- Women have frequently been shown to be at increased risk of psychological problems in emergency affected populations (IASC 2007). Particularly in emergencies where mental health issues (anxiety disorders, post traumatic stress disorder, etc.) are reported to be common; for example the recent experience of Syrian refugee populations (MSF 2013).

- Gender-based violence (GBV)¹⁰ is especially problematic in the context of complex emergencies and natural disasters. Civilian women are vulnerable to exploitation, violence and abuse, simply because of their gender and status in society (IASC 2005). Increases in forced early marriage may also lead to more adolescent pregnancies in protracted emergencies.

Disruption of services and support; negatively affecting health, birth outcomes and child care

- During crises, access for pregnant women to essential routine services may be disrupted, such as; Antenatal Care (ANC), routine Obstetric care, Reproductive health and PMTCT¹¹ and/or other support services for those with HIV infection. The loss of this support will increase the risks both to the mother and child of pregnancy and childbirth complications. For example, in a recent survey of Syrian refugees in Lebanon, 8% of the women surveyed needed ANC, but of these two thirds could not get the services they needed (Gulland 2013).
- Women may face constraints in accessing essential humanitarian services as a result of insecurity¹², cultural discrimination and/or limited mobility.
- The impact of emergencies (in particular a poor health environment, insecurity and poor access to food) can exacerbate already existing reproductive health vulnerabilities and risks for mothers and their children; particularly if key components of reproductive health services (such as prevention and management of HIV, sexually transmitted infections and family planning) are lacking, or disrupted due to the emergency (NW/ENN/GNC 2011).
- Breast milk alone provides ideal nutrition for young infants and valuable protection from infection and its consequences. During emergencies, where adequate water supply and sanitation is usually lacking and infection rates elevated, it is an important lifesaver. Successful breastfeeding depends on frequent suckling, confidence among women in their ability to produce milk, and a supportive environment. Breastfeeding may be disrupted during emergencies, as physical and emotional stress can reduce women's confidence and diminish the capacity of other family members to help them. In addition, increases in the incidence of preterm and LBW infants which are often experienced during emergencies also create a greater need for breastfeeding support (WHO 2004).

4. IMPLICATIONS

The above have particularly serious implications both for women and their children.

4.1 For women

- Maternal undernutrition is a risk factor for adverse birth outcomes, with women of short stature at heightened risk of difficult labour¹³ (Chan & Lao 2009, Sheiner et al 2005).
- Few studies have prospectively assessed the risk of maternal mortality, specifically in relation to maternal anthropometry (Black et al 2013). An exception is one study in Nepal (Christian et al 2008) in

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