



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 kcals/day and lactating women an additional 500 kcals/day

² Pregnant women require an addition 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 effected 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 which MUAC during pregnancy was inversely associated with all-cause maternal mortality up to 42 days post-partum, after adjusting for numerous factors.
- Insufficient intakes of EFAs to meet needs during pregnancy and lactation has been identified as a risk factor for maternal depression, with consequences for the mothers wellbeing and that of her offspring (see below).

¹⁰ Sexual violence is the most immediate and dangerous type of GBV occurring in acute emergencies. Once the acute phase is over other forms of GBV occur and/or are reported with increasing frequency. These include, among others, harmful traditional practices (female genital mutilation, forced early marriage, honour killings, etc.) and domestic violence

¹¹ Prevention of mother to child transmission of HIV

¹² In particular risk of physical and sexual abuse

¹³ Measured by assisted or caesarean deliveries or by the capacity of the pelvis being insufficient to allow the foetus to successfully negotiate the birth canal

- Anaemia in pregnancy increases the risk of maternal mortality. It is estimated to be a risk factor for more than a quarter of maternal deaths (Black et al 2013).
- Calcium deficiency increases the risk of pre-eclampsia, currently the second leading cause of maternal death (Black et al 2013).
- Pregnancy reduces immunity, resulting in increased susceptibility to malaria infection, risk of severe illness, anaemia (Steketee, Wirima & Campbell 1996, Nosten et al 1999) and maternal death (WHO 2007b).
- Adolescent pregnancy is associated with a 50% increased risk of stillbirths and neonatal deaths, and increased risk of preterm birth, LBW, and asphyxia (Bhutta et al 2013). Adolescents are prone to complications of labour and delivery (WHO 2007a) and those under 15 years of age are, twice as likely to die during labour as older females (UNFPA 2013). Evidence also indicates that the pregnancy actually halts their own linear growth, as well as leading to emaciation and fat loss (Rah et al 2008). All of which exacerbates the intergenerational cycle of undernutrition (see below section 3.2).
- Short inter-pregnancy intervals are associated with a higher probability of maternal anaemia (32%) and stillbirths (40%) (Conde-Agudelo 2012).
- A growing body of evidence indicates that GBV, in particular domestic violence, predicts poor physical health and nutrition in women particularly in the period during and immediately after pregnancy (Jejeebhoy et al 2010), as well as compromising children's growth (Ziaei et al, 2012, Rico et al 2011). These associations are reported to be linked to women's bargaining power and control over resources in the household (UNICEF/LSHTM 2011) and to food and livelihood security. However, little work has been done on this specifically in the emergency context or on the nutritional effects of sexual violence outside the household in conflict situations.

KEY POINTS - *Implications for women*

The implications for women themselves of their heightened vulnerabilities in the humanitarian context are many and varied; they include:

- Increases in MN deficiencies lead to major impacts on mortality risks;
- Reduced immunity (due to pregnancy) increasing risks of contracting infectious diseases such as malaria;
- Adolescent pregnancies result in more neonatal deaths and obstetric complications and can halt the linear growth of the girls themselves;
- Increases in GBV predicts poor physical health and nutrition in women.

4.2 For their children

- Maternal acute undernutrition (low BMI) puts infants at higher risk of foetal growth restriction and therefore being born small for gestational age (SGA); both term and preterm. SGA infants are at higher risk of neonatal and postnatal death and of stunting in childhood (Black et al 2013). Foetal growth restriction is estimated to cause more than a quarter of all new-born deaths, with LBW infants estimated to be approximately twice as likely to die (from all causes) than those weighing more than 2.5kg (Black et al 2008). Children born undernourished (with LBW¹⁴) are also at higher risk of developing non-communicable diseases such as type 2 diabetes and heart conditions in adulthood (WHO 2012a). In developed countries, foetal growth restriction is more associated with risk factors such as maternal smoking, in less developed countries however, it is maternal undernutrition that most often leads to the birth of small infants (Black et al 2008).

¹⁴LBW infants are described in terms of being 'undernourished' because they were deprived of essential energy and nutrients before they were born.

- Undernourished children are more likely to grow into shorter adults, to have lower educational achievements, and for girls, are more likely to grow into women who will give birth to smaller infants themselves – the intergenerational cycle (Victora et al 2008).
- Symptoms of anaemia are fatigue and reduced work capacity for women to carry out their existing roles (Stoltzfus et al 2011). This may leave them less able to contribute to household resources and to care for children. The implications of this may be negative for the household in general (poorer, more food insecure, less able to access services) and for children in particular.
- Maternal vitamin A deficiency is associated with increased LBW and infant mortality (Black et al 2013)
- Folic acid deficiencies in the periconceptional period (three months before and after conception) are associated with a higher prevalence of birth defects (Lassi et al 2013b).
- While maternal undernutrition (unless it is severe) has limited effect on the volume of breast milk, research indicates that maternal intakes/stores of EFAs and of key micronutrients¹⁵ do effect the concentrations of these nutrients in breast milk (FAO 2011). Recent research points towards significant effects of maternal deficiency on the concentration of B Vitamins in breast milk, in particular for vitamin B12¹⁶ (Allen 2012). Risk of infant depletion is therefore higher as a result. This is particularly relevant for vitamin A, where adequate content in breast milk is vital for infant status because stores are low at birth (Black et al 2008).
- As brain development is faster in the early years of life compared to the rest of the body, insufficient maternal intakes of specific EFAs, translated into poor breast milk concentrations, leave infants more vulnerable to inadequate consumption; with potentially negative consequences for their cognitive development (Briend et al 2011).
- Iodine deficiency during pregnancy can cause maternal and foetal hypothyroidism and impair neurological development of the foetus. The consequences depend upon the timing and severity of the hypothyroidism; the most severe manifestation is cretinism (Zimmerman 2012). Deficits in child brain development in less severe forms of maternal iodine deficiency are suggested.
- Disruption to appropriate breastfeeding practices has detrimental effects which may continue well after the emergency phase. Suboptimal breastfeeding accounts for an estimated 800,000 global deaths in children under five annually (Black et al 2013).
- It has been estimated that malaria during pregnancy is responsible for 35% of preventable LBW (Steketee, Wirima & Campbell 1996) and contributes to 75,000 to 200,000 infant deaths each year, depending on fluctuating malaria incidence (Steketee et al 2001).
- Evidence is growing that maternal mental health problems are important determinants of suboptimal caregiving and health seeking behaviours (Ruel & Alderman 2013) and early childhood underweight and stunting (Surkan et al 2011). In emergencies, mothers exposed to psychological trauma are often overwhelmed, exhausted and/or depressed. If traditional support structures have been disrupted, the wellbeing of children may suffer as a result (IASC 2007).



¹⁵ Vitamin A, Iodine, Thiamine, Riboflavin, Pyridoxine, Cobalamin

¹⁶Sufficient content in breast milk to provide only 16% of an infant's daily requirement

KEY POINTS - *Implications for children*

- The implications of women's heightened vulnerabilities in the humanitarian context for their children are also profound, such as: Infants of acutely undernourished mothers are at greater risk of being born undernourished (SGA or LBW) leading to higher risk of neonatal and postnatal death, of stunting in childhood, and at heightened risk of developing non-communicable disease such as diabetes later in life, should they survive;
- Undernourished infants who do survive are more likely to grow into shorter adults, have lower educational achievements and for girls, more likely to give birth to smaller infants themselves; perpetuating the intergenerational cycle of undernutrition;
- Specific maternal MN deficiencies; such as Vitamin A, Folic Acid and Iodine are associated with increased LBW and infant mortality, birth defects and impaired foetal neurological development respectively;
- Disruption to breastfeeding has lasting adverse effects on mortality risk and development. In addition undernourished lactating women pass on some of their macro and micronutrient deficiencies through their breastmilk leaving their infants at greater risk of depletion in key MNs and EFA's;
- Malaria during pregnancy is responsible for increases in LBW and contributes to infant deaths.

5. CURRENT INTERNATIONAL GUIDANCE ON MATERNAL NUTRITION

Almost all countries have committed themselves politically to ensuring the right of PLW to good nutrition, through the Convention on the Elimination of all Forms of Discrimination Against Women, adopted in 1979¹⁷. Despite this, the World Health Organization (WHO) did not endorse any policy commitments with regard to maternal nutrition until 2012. Before then, while a number of maternal health policies were in place, the only nutrition policy guidance from the various technical departments of WHO specifically for women, was related to the control of maternal anaemia (Shrimpton 2012). In 2012 however, WHO released and submitted to the sixty-fifth World Health Assembly (WHA) a report 'Nutrition of women during pregnancy', to complement their draft comprehensive implementation plan on maternal, infant and young child nutrition (WHO 2012a). The report emphasises the importance of women's nutritional status pre-conception and during pregnancy and lactation for healthy outcomes for themselves, their children and for future generations. Of particular relevance to the emergency context the report notes:

'their health depends greatly on the availability of food, and they may be unable to cope with their increased nutrient needs during pregnancy in situations of food insecurity.....In countries affected by disasters and crises, women are also often already chronically undernourished..... Understanding the unique nutritional needs of pregnant and breastfeeding women is also important in developing appropriate food responses'

The report calls for countries to raise the profile of women's nutrition and expand the coverage of proven interventions targeting women's nutrition. It does not detail appropriate components of emergency response, but does state that countries should 'include specific provisions for women in preparedness plans for emergencies'.

The SUN framework includes a number of direct interventions for maternal nutrition, and a recent review (Bhutta 2013) does pull together both direct and indirect interventions for maternal nutrition (see box 2). These include dietary interventions and disease prevention and control, as well as food security, WASH,

¹⁷<http://www.un.org/womenwatch/daw/cedaw/text/econvention.htm>

reproductive health and women’s empowerment, as relevant nutrition sensitive intervention areas. *Yet the emergency context is not specifically dealt with in these compilations.* The recently published WHO ‘Essential Nutrition Actions’ document also pulls together a number of interventions targeted at women of reproductive age and pregnant women (focussing mainly on supplementation) and does include a section on care and support for pregnant women during emergencies which is reflected in the below sections (WHO 2013a).

Box 2. Interventions for maternal nutrition (Bhutta 2013)

Nutrition specific programmes

Dietary Interventions

- Nutritional counselling
- Food distribution
- Micronutrient supplementation
- Fortification programs

Disease prevention and control

- Malaria control
- HIV prevention and treatment
- Deworming

Nutrition sensitive programmes

Food security

- Agricultural interventions
- Cash incentives
- Post conflict rehabilitation

Water, sanitation and hygiene strategies

Reproductive health

- Family planning/child spacing
- Safe childbirth practices
- Antenatal care

Women’s empowerment

- Women’s education
- Prevention of gender based violence

The Sphere Project 2011 gives some key actions and guidance notes with respect to direct interventions to support maternal nutrition (see box 3, below). Most however are linked to infant feeding and the welfare of the child and although the guidance does refer to specific interventions in terms of maternal nutrition, this is the only place within the Sphere handbook where maternal nutrition needs are reflected.



Box 3. Sphere Project: actions and guidance for maternal nutrition

Standard: Infant and young child feeding: Basic and skilled support.

Mothers and caregivers of infants and young children have access to timely and appropriate feeding support that minimises risks and optimises nutrition, health and survival outcomes.

Action: Give priority to pregnant and breastfeeding women to access food, cash and/or voucher transfers and other supportive interventions.

- **Guidance:** Support should be prioritised for mothers, caregivers and pregnant and breastfeeding women to meet immediate essential needs. Households with children under 24 months and breastfeeding mothers of all new-borns should be registered and linked to food security programmes to ensure access to adequate food. Designated shelters for mothers and caregivers enable access to peer-to-peer and basic IYCF support. Breastfeeding support should be integrated within key services such as reproductive health, primary healthcare, psychosocial services and selective feeding programmes from the outset.

Action: Integrate skilled breastfeeding counselling in interventions that target pregnant and breastfeeding women and children aged 0–24 months.

- **Guidance:** Pregnant and breastfeeding women should receive daily supplements providing one daily requirement of MMNs to protect maternal stores and breast milk content, whether they receive fortified rations or not. Iron and folic acid supplements when already provided should be continued. Women should also receive Vitamin A within six to eight weeks of delivery. Micronutrient supplementation should be in accordance with international recommendations on doses and timing. Referral to psychosocial services may be needed, especially in traumatised populations. Although nutrition support of the adolescent mother is important, programmes to prevent adolescent pregnancy are likely to have the most impact on LBW incidence.

Standard: Management of acute malnutrition and micronutrient deficiencies: MAM.

Moderate Acute Malnutrition (MAM) is addressed.

Action: Address IYCF with particular emphasis on protecting, supporting and promoting breastfeeding.

- **Guidance:** *Breastfeeding mothers* of acutely malnourished infants under 6 months should be admitted to supplementary feeding, independent of maternal nutrition status. Moderately malnourished mothers can successfully breastfeed and need adequate nutrition support to protect their own nutritional status. Mothers should receive supplementary feeding rations, skilled breastfeeding support on exclusive breastfeeding and advice on safe, nutritious and responsive complementary feeding. Infants under 6 months who are acutely malnourished should be referred appropriately for skilled breastfeeding support and inpatient care as necessary.

The recently published Nutrition Cluster handbook (GNC 2013) does suggest the potential inclusion of women in targeted or blanket supplementary feeding, and food aid as a strategy for incorporating gender considerations into the nutrition cluster response. However, it stops short of highlighting maternal nutrition as an essential part of the response.

Other specific international guidance¹⁸ for maternal nutrition has been compiled below, both for the general context and, where it exists, for the emergency context. However, despite evidence of increases in birth weight following improvements in the micronutrient to energy ratios of the general ration through addition of fresh fruit, fortified commodities and links to maternal supplementation (Shrimpton et al 2009), it proved difficult to locate any cross cutting guidance during the literature search; for provision of a package of these interventions to ensure that micronutrient needs of women were adequately met.

¹⁸For this review only international multiagency guidance and UN guidance has been included. Although it is recognised that an array of individual NGO guidance exists, it was not possible within the scope of this document to review it all.

KEY POINTS - *General international guidance for maternal nutrition*

- Current international guidance on maternal nutrition has been very limited until recently, with the submission to the World Health Assembly of a 2012 WHO report 'Nutrition of women during pregnancy' and the publishing of the WHO 2013 Essential Nutrition Actions for improving maternal, newborn, infant and young child health and nutrition;
- The Scaling Up Nutrition (SUN) framework includes a number of direct interventions for maternal nutrition, although the emergency context is not specifically dealt with in any of these recent reports or compilations;
- The Sphere project 2011 also gives some key actions and guidance notes for direct interventions to support maternal nutrition; however most are linked to infant feeding and the welfare of the child only;
- The Global Nutrition Cluster (GNC) 2013 handbook only suggests the potential inclusion of women in supplementary feeding.

5.1 Macronutrient Supplementation

General recommendations include

Provision of nutritional advice and balanced energy and protein supplements to undernourished pregnant women (WHO 2013a, WHO 2013b) - based on evidence of reduction in risk of SGA infants (by 34%), stillbirths (by 45%) and increased birth weight (by 73g) with balanced protein/energy supplementation (Imad & Bhutta 2011, Kramer & Kakuma 2010). The most pronounced effects were found with malnourished women. A Cochrane review (Orta 2013) found similar positive results and no significant effect for preterm birth or neonatal death. This review also concluded that high-protein supplementation does not seem to be beneficial and may be harmful to the foetus, based on evidence from one study that it was associated with increased risk of SGA babies. There is also growing evidence that improving the quality of the diet of the mother during the first half of pregnancy can have as big an effect on birth weight as providing food supplements later in pregnancy. The risk of delivering a LBW baby can be determined very early in pregnancy and the influence of maternal nutritional status on pregnancy outcomes is more important in early rather than late pregnancy (UNSCN 2009).

Essential Fatty Acid supplementation (200–300 mg/d DHA) for PLW (FAO 2011) - based on experimental evidence of a strong association, between low maternal intakes and both maternal postpartum depression and low breast milk composition. Additionally, of the positive effect of supplementation of women with DHA on improved infant visual and cognitive function.

Recommendations in Emergencies

Inclusion in supplementary feeding with fortified commodities of all PLW in emergency situations (WHO *et al* 2000)(WHO 2013a) – based on evidence of their additional nutrient requirements. Although the additional energy requirements of PLW are included in General Food Distribution (GFD) planning figures, this does not ensure PLWs are targeted with the additional calories and it is recognised that micronutrient needs may not be met (WHO/UNICEF/WFP 2006).

However, guidance from the Global Nutrition Cluster (GNC 2012) suggests a more targeted approach with the recommendation that:

'All PLW (up to 6 months postpartum).....who have MAM should be included in the targeted supplementary feeding programme (TSFP) for MAM, regardless of their age or pregnancy status'.

This guidance further states that the evidence base for **blanket supplementary feeding** (BSFP)¹⁹ for prevention of acute undernutrition primarily focuses on children.

¹⁹ i.e. targeting all pregnant and lactating women rather than those identified as 'malnourished'

However the distribution of appropriately fortified blended foods to all pregnant and lactating women is included in individual UN agency guidance (UNHCR & WFP 2011) and in the recent WHO 'Essential Nutrition Actions' document (WHO 2013a). This states that fortified blended food (providing 10%–12% (up to 15%) of energy from protein and 20%–25% energy from fat) and fortified to meet two thirds of daily requirements for all micronutrients (particularly iron, folic acid and vitamin A) should be provided, in addition to the basic general ration, either through maternal and child health structures (in conjunction with other health services) or through blanket supplementary feeding programmes. This reflects evidence that blanket feeding is superior to recuperative feeding at reducing the number of underweight children and that if delivered as part of a preventive approach²⁰, has the biggest positive impact on nutritional status (Van Haeften et al 2013). Some concerns have indeed been raised, particularly for stunted populations (Rush 2000) that supplementary feeding for non malnourished women could increase the risk of obstructed labour by increasing foetal size (the belief that energy intake restriction in pregnant women leads to easier births is also reported in a number of cultures); however no research evidence of this could be located during this literature search.



Establishment of referral for required nutritional care and support for adults infected with HIV (including PLW) and their families (NW/ENN/GNC 2011) - this includes targeted food support, treatment of acute undernutrition (*ibid*) and guidance and counselling on infant feeding (Sphere 2011)²¹.

KEY POINTS - Existing international guidance on macronutrient supplementation

- Provision of nutritional advice and balanced energy and protein supplements to undernourished pregnant women is strongly recommended;
- Evidence is growing, that improving the quality of diets during the early stages of pregnancy can have as much effect on improving birth weights as supplementing during later pregnancy;
- More evidence is required of the effect of essential fatty acid supplementation, although early indications are that it could have a beneficial effect on both maternal wellbeing and breast milk composition.

During emergencies, the latest guidance from the GNC in 2012 is that:

- All PLW with MAM should be included in the targeted SFP, regardless of their age or stage of pregnancy;
- The evidence base for the benefits of blanket SFP to all PLW regardless of anthropometric criteria needs to be strengthened before clear guidance can be given.

Additionally, some cultural perceptions that additional feeding can increase the incidence of obstructed labour (due to larger size of the foetus) was reported, however no published evidence of this could be located during the literature search.

²⁰Including an integrated package of community and population-based behavioural change communication and health and nutrition services

²¹The area of support for HIV in the emergency context and in relation to women in particular has not been sufficiently covered during this review.

5.2 Micronutrient Supplementation

General recommendations include

Iron/Folic acid supplementation for pregnant women (WHO 2012b) - based on evidence that antenatal supplementation with iron, either alone or in combination with folic acid, is associated with:

- 69% reduction in incidence of anaemia (Imad & Bhutta 2012),
- 20% reduction in the risk of LBW (Pena-Rosas & Viteri 2012, Black et al 2013),
- 54% reduction in neonatal mortality (Zeng et al 2008) and
- 34% reduction in risk of death in children under 5 years (Dibley et al 2012).

Evidence also exists for folic acid supplementation during pregnancy being associated with a 79% reduction in anaemia and improved mean birth weight (Lassi et al 2013b). WHO suggests (2012a) that these effects are the same in malaria endemic areas (despite some studies indicating an increased risk of malaria in children receiving iron supplements). To prevent any negative effects in malaria-endemic areas, measures to prevent, diagnose and treat malaria are recommended in conjunction with these supplements for pregnant women.

The strength of evidence for the benefits of providing multiple micronutrients (MMNs) instead of iron/folic acid only, is currently being debated. Although the WHO recommends that further evidence is required, the most recent reviews (Bhutta et al 2013, Haider et al 2011, Haider & Bhutta 2012, Zerfu & Ayele 2013) have found similar results for anaemia, but significantly increased benefits of MMN supplementation (tablets) over Iron folate supplementation during pregnancy, on reducing SGA births, LBW and preterm births; with no adverse effects – supporting the potential replacement of iron-folate supplements with MMN supplements (tablets), in populations at risk.

Iodine supplementation for PLW – in countries where less than 20% of household have access to iodized salt, either through purchase from markets or iodised salt in GFDs (WHO, UNICEF 2007) – based on evidence of the impact of iodised salt on the iodine status of women (Laurberg et al 2007, Zimmermann 2007, WHO/UNICEF 2007) and more recent evidence that for PLW and children less than two years, iodine needs might not be adequately covered by iodized salt, where Universal Salt Iodisation is not fully implemented (Anderson et al 2007). In moderate-to-severely iodine-deficient areas, controlled studies demonstrated that iodine supplementation before or during early pregnancy eliminates new cases of cretinism, increases birth weight, reduces rates of perinatal and infant mortality and generally increases developmental scores in young children by 10–20% (Zimmermann 2012).

Calcium supplementation during pregnancy in areas of low calcium intake (WHO 2011c) – based on strong evidence that calcium deficiency increases the risk of pre-eclampsia (Hofmeyr et al 2010, Black et al 2013)

Vitamin A Supplementation (VAS) for pregnant women in areas where vitamin A deficiency is a severe public health problem (WHO 2011b) – based on strong evidence of the effects of VAS on maternal night blindness in vitamin A deficient populations (Van den Broek 2011) and on haemoglobin levels and anaemia risk (Thorne-Lyman & Fawzi 2012). However, insufficient evidence of effect of VAS on maternal and neonatal mortality has been found and effect on birth weight is only indicated for HIV positive mothers (*ibid*).

Recommendations in Emergencies

MMN supplementation for pregnant women in emergencies/populations at risk (WHO 2011a, WHO/UNICEF/WFP 2006)–MMN's (tablets) are recommended for use in emergency contexts due to the increased risk of micronutrient deficiencies (WHO/UNICEF/WFP 2006), yet MMN powders are specifically *not* recommended by WHO for use by pregnant women, due to insufficient evidence of effects (both

positive and negative) (WHO 2011a). This is underlined by recent evidence of negative effects²² accompanying supplementation with MMN powders in children (Soofi et al 2013).

Iodisation of all salt used in GFDs (WHO et al 2000) – based on evidence of impact of iodised salt on iodine status of women.

VAS for pregnant women and for lactating women within 6 weeks of delivery in emergencies (WHO, UNICEF, WFP, UNHCR 2000) – based on the above evidence.

KEY POINTS - Existing International guidance on micronutrient supplementation

- Strong evidence supports the provision of iron and folic acid for pregnant women, and folic acid is also recommended during pregnancy, with additional prevention, diagnostics and treatment of malaria in endemic areas, to prevent any negative effects of this supplementation;
- Evidence is growing, but consensus has not yet been reached to recommend the provision of multiple micronutrient (MMN) tablets instead of iron/folate;
- Iodine supplementation for pregnant and lactating women (PLW) is also recommended in areas where universal salt iodisation is not fully implemented;
- Calcium supplementation for pregnant women in areas of low calcium intake is strongly recommended, along with vitamin A supplementation; especially in areas where deficiency is a severe public health problem.

During emergencies:

- MMN tablets are recommended for pregnant women due to the likelihood of increased deficiency in populations at risk;
- Iodised salt should be used for all general food distributions;
- Vitamin A supplementation is strongly recommended for all PLW (for lactating women, within 6 weeks of delivery).

5.3 Care and Support

Recommendations in Emergencies

Breastfeeding care and support (IFE Core group 2007)(WHO 2013a) – the protection, promotion and support of breastfeeding through:

- i) appropriate assessment of breastfeeding challenges,
- ii) provision of a package of breastfeeding support services²³,
- iii) support for safe and appropriate alternative feeding where required,
- iv) promotion of the International Code of Marketing of Breast-milk Substitutes (BMS), subsequent relevant WHA resolutions and national law on the marketing of BMS, where it exists.

In addition, support should be provided for easy and secure access for caregivers to water and sanitation facilities, food and non-food items and inclusion of PLW in SFPs, if available. This is based on a large body of evidence of the benefits of breastfeeding for child survival, growth and development, including the link of breastfeeding to infant cognitive development (Nyaradi et al 2013). It is also based on the practical and psychological factors associated with the emergency context that make appropriate breastfeeding particularly challenging, and the alternatives (formula or early introduction of complementary foods), particularly risky.

²²Increase in diarrhoea burden and respiratory morbidities

²³ Including breastfeeding spaces if required, counselling services integrated into ante and postnatal care, family planning and maternity services, mother to mother breastfeeding support

Care for caregivers in emergencies (IASC 2007) through organising meetings/providing spaces where caregivers of young children can support each other and discuss strategies for optimal child care and other concerns. Referral options for additional support for carers with signs of depression or severe mental health problems should be provided (WHO 2013a) – based on increasing evidence (above) of the link between maternal depression, psychosocial support and nutritional outcomes.

KEY POINTS - Existing International guidance on care and support of women

Breastfeeding care and support is strongly recommended, which includes:

- Assessment of breastfeeding challenges;
- Provision of a package of support services, support for safe and appropriate alternative feeding where required;
- Promotion of international codes, resolutions and national laws regarding the marketing of breast milk substitutes.

Caring for the caregivers, including for their psychological needs, is also recommended particularly during high stress emergency situations.

5.4 Health Related Interventions

Recommendations in Emergencies

Provision of insecticide-treated bed nets for all pregnant women (WHO 2005) either through a general population or targeted distribution.

Intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP) to pregnant women (except during the first trimester) at each routine antenatal visit till the time of delivery, in areas with moderate to high malaria transmission in Africa (WHO 2013c) – based on WHO meta-analysis review that it prevents the adverse consequences of malaria on maternal and foetal outcomes in these contexts (WHO 2012c). The review also found that three or more doses are associated with higher mean birth weight and fewer LBW births than 2 doses and that the effect was consistent across a wide range of SP resistance levels.

Prophylaxis to pregnant women in the 2nd & 3rd trimester for management of intestinal parasites (WHO et al 2000) – despite limited evidence from controlled trials of the effect of administration of antihelminthics for soil transmitted helminths on maternal anaemia or pregnancy outcomes (Haider et al 2009), findings from observational studies suggest a potential benefit on maternal anaemia, birth weight and infant mortality (Imhoff-Kunsch & Briggs 2012).



Provision of a minimum package of reproductive health services at the initial stages of an emergency, including key interventions which have a high impact on maternal, neonatal and infant nutritional status (NW/ENN/GNC 2011) (Sphere 2011)– include interventions focussed on; all women and girls, those specifically targeted during pregnancy, childbirth, post natal, on-going reproductive health and measures for the prevention and clinical management of sexual violence. Adolescents should specifically be targeted, as programmes to prevent adolescent pregnancy are likely to have the most impact on LBW incidence (Sphere 2011).

KEY POINTS - Existing international guidance on health related interventions

- The provision of insecticide treated bed nets is recommended for all pregnant women, as is prophylaxis malarial treatment in endemic areas;
- Prophylactic treatment for intestinal parasites is also recommended for women in the 2nd and 3rd trimester of pregnancy;
- Provision of a minimum package of reproductive health services is strongly recommended, to ensure appropriate ANC, safe delivery and post-partum services are available;
- A focus on adolescents is highlighted as a key aspect for efforts to reduce the incidence of LBW.

5.5 Nutrition Sensitive Interventions

“Interventions/programs that address the underlying determinants of fetal and child nutrition and development – food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment – and incorporate specific nutrition goals and actions”
(Ruel & Alderman 2013)

The 2013 *Lancet* series concluded that there is little evidence as yet linking particular nutrition sensitive interventions in food assistance (cash or food), health, agricultural, protection or education sectors to nutritional outcomes for women or children (Girard et al 2012, Ruel & Alderman 2013). However, the weaknesses of integrating nutrition goals into these interventions were identified as a likely explanation for the scarcity of evidence of nutritional benefits.

Evidence was however identified for the effects of homestead programmes promoting vitamin A rich foods²⁴ on child vitamin A intake and to a lesser extent vitamin A status; while effects on maternal intakes and status have not yet been found. Despite this, a consistent message from the *Lancet* literature is that any nutritional effect of agricultural interventions is more likely when women are targeted and where women’s empowerment activities are included (*ibid*). Unfortunately some review evidence indicates that in Africa, nutrition sensitive interventions are less likely to be focused on women of reproductive age than direct nutrition interventions (Bhutta 2013).

Few studies have measured specific aspects of women’s empowerment as a pathway to improved nutrition. However, studies have demonstrated a relationship between dimensions of women’s empowerment and nutrition and also of a relationship between women’s *disempowerment* (e.g. domestic violence) and adverse nutritional impacts. These impacts are further supported by evidence that men and women have different preferences for the allocation of resources within a household (Gillespie & Van den Bold 2013). Few studies have equally tested interventions to tackle maternal mental health and child growth together (Corna 2013).

It is increasingly recognised that cash or vouchers can replace traditional food assistance mechanisms, if there is an accessible and diverse diet available on the market. This can reduce costs, better support markets and promote dignity and choice (Haver et al 2013). However, evidence on nutrition outcomes for cash remains very limited in emergency contexts (Bailey & Hedlund 2012) and some new evidence indicates the potential for cash interventions (compared to food aid) to actually undermine women’s decision making power within the household (Fenn et al, under review). Discussion is on-going, based on new

²⁴ Orange flesh sweet potato, in particular

evidence that a combination of cash with other specialised nutritional inputs provided for children via BSFPs increases the effectiveness of the nutrition response (Epicentre/WFP/MSF 2012). Evidence that fresh food vouchers can lead to more diverse diets being consumed in emergencies (ACF 2012a) has also not been translated into measured results for nutrition; and similar to the above, evidence of how much these programmes are or could be designed to support maternal nutrition, is lacking.

In addition, the potential of some food assistance programmes to undermine maternal and child nutrition, if not developed using a nutrition sensitive lens, has been highlighted (Haver et al 2013). This may be as a result of increasing women's physical workload or time away from childcare. In particular, there is some evidence of negative impacts on nutrition status where cash transfers are given alongside non-health related conditionalities (Gillespie & Van den Bold 2013).

KEY POINTS - *Nutrition Sensitive Interventions*

- Little evidence is yet available linking particular interventions in food assistance, health, agricultural protection or education sectors to nutritional outcomes for women or children; although this is likely due to the weaknesses of measuring nutrition outcomes in programming to date;
- More evidence is clearly required before any associations or cause and effect relationships can be adequately described;
- Some studies have demonstrated a relationship between women's empowerment and nutrition and also of a relationship of women's *disempowerment* and adverse nutritional impacts; but further work is required before concrete guidance can be given;
- While cash transfers/voucher programmes are becoming more common, there is little evidence yet that they lead to any improvement of nutrition outcomes during emergency programming; again more work is required to establish associations and effects (positive or negative);
- We are reminded that food assistance programmes must be developed using a nutrition sensitive lens, in order to reduce the risk of inadvertently undermining efforts to improve maternal nutrition, for example by increasing their physical workloads or removing them from child care activities.

6. WHAT IS BEING DONE IN EMERGENCIES?

6.1 Assessment and response analysis

Measurement of nutritional status of women of reproductive age is often included in national MICS and DHS surveys; however BMI measurements are used, which can be problematic for estimating the prevalence of undernutrition in women, particularly if they are pregnant. Nutritional surveys using SMART ENA software do not generally collect anthropometry on PLW or women of reproductive age. The Nutrition Cluster handbook (GNC 2013) does specify the need to collect information (from pre-crisis sources, or at the onset of the emergency) on the needs and capacities of women, along with other vulnerable groups. Specific needs assessment data is outlined in The Harmonised Training Package (HTP), Module 7: Measuring malnutrition: population assessment, and includes:

- Anthropometric information on women of child-bearing age and/or PLW, as well as anthropometric information on women and men from other age groups.

The specifics of how this should be done and how to interpret any results are not covered, however.

As noted above, individual guidance exists especially in relation to micronutrient and malaria interventions for women; to be implemented based on an assessment of the context, e.g. background levels of Vitamin A

deficiency. Beyond these individual examples of indicators to trigger response there is no clear guidance, linking the assessment of factors relating to maternal nutrition and appropriate response packages.

6.2 Targeting

Targeting of PLWs in emergency situations is usually conducted through use of MUAC, due to its relatively strong association with LBW, narrow range of cut-off values, simplicity of measurement and it not requiring prior knowledge of gestational age. While there is very limited literature available on optimal targeting cut offs, the MUAC values for which most adverse effects were identified (in terms of birth outcomes) were <22.0 and <23.0 cm (Ververs et al, in press). Additional research is underway to help define appropriate standardized MUAC cut-offs as indicators of MAM and Severe Acute Malnutrition (SAM) among adolescents and adults, including pregnant women and lactating women until 6 months postpartum (FANTA 2013).

Data from a recent global mapping exercise indicates that for targeted supplementary feeding, over 90% of countries implementing targeted supplementary feeding programmes for PLW (35) were using MUAC as the anthropometric admission criteria; with an even split between countries using cut-offs for admission of <21.0 and 23.0cm (WFP/Valid 2013). The same mapping indicated that WFP programmes in a substantial number of countries (19) are implemented on a blanket basis for all PLW irrespective of any MUAC cut-off.

Due to not many women accessing nutrition-promoting services until month 5 or 6 of pregnancy, it is vitally important that women are supported to enter pregnancy in a state of optimal nutrition. Population level interventions targeted at women in general, and in particular adolescents, have therefore been suggested to be the most appropriate (Bhutta et al 2013). However, in the emergency context most interventions are targeted more narrowly to PLWs, and usually only in the second to third trimester.

KEY POINTS - *What is being done in assessment and targeting during emergencies*

- There is limited guidance on effective assessment of women's nutritional status and how this should be linked to the design of appropriate responses;
- The targeting of PLWs for supplementary feeding in emergency situations is usually conducted through MUAC measurements however there are variations in the cut-off being used;
- In a substantial number of cases supplementary feeding is being implemented for all PLW irrespective of anthropometric criteria;
- It has been suggested that it would be more appropriate to use population level targeting for all women (in particular all adolescents), although current practice sees interventions usually only targeting PLWs through supplementary feeding programmes and some micronutrient supplementation.

6.3 Interventions and research

The most widespread direct nutrition interventions for maternal nutrition in emergencies are supplementary feeding of PLWs (either targeted or blanket) and micronutrient supplementation.

Data from the recent MAM global mapping exercise indicates that about 2 million PLW were treated for MAM through WFP supported TSFP in 35 countries in 2012²⁵. The majority of these were in West, Eastern and Central Africa and implemented in the relief or recovery context. In addition a further 1.6 million PLWs were included in BSFPs in 2012 in 19 countries. For both targeted and blanket supplementary feeding of

²⁵ This does not include admissions to programmes not supported by WFP

PLWs, the WFP product Supercereal²⁶ was most commonly used. Despite the large numbers involved in these programmes, the mapping exercise was not able to report on performance outcomes for PLWs, due to insufficient completeness and quality of data (WFP/Valid 2013). Compiled information on the extent of other direct nutrition interventions targeting maternal nutrition in the relief of recovery context, e.g. micronutrient supplementation, was not found during the literature search for this technical background document. However on global terms UNICEF figures report that they supplied iron/folic acid tablets through central procurement²⁷ enough for 7.7 million women in 2012 (an almost 100% increase from 2011) and MMN tablets for 1.5 million women in 2012 (little change in levels since 2008)²⁸.

A recent review of published evidence (Hall et al 2011) reviewed nutrition studies between 2004-10, conducted in the emergency context. It included general studies of the impact and effectiveness of emergency nutrition programmes, surveys of undernutrition and in particular, studies assessing the impact of MAM programmes. The review identified just 5 studies (out of 22) which included women in the survey population. Three of these were surveys assessing the prevalence of micronutrient deficiencies and/or acute undernutrition in women, one was a qualitative study of the storage and use of fortified blended foods and just one (Shrimpton et al 2009), was an analysis of the effectiveness of improving the quality of women's diets in emergencies through a combination of fortification and supplementation. None of the studies reviewed assessed the effectiveness of targeted or supplementary feeding for PLW either in terms of outcomes for women, or for their children.

A review commissioned by the GNC of the potential of Lipid-based Nutritional Supplements (LNS) for improving the adequacy of the general ration (Chaparro & Dewey 2009), indicated that standard rations including fortified blended foods²⁹ met less than 75% of the recommended intake for several micronutrients, fat and essential fatty acids. The review developed specifications for a 'one size'³⁰ LNS, to fulfil both nutritional and practical requirements and to be considered for incorporation into the food packages provided in emergency settings.

In response to this GNC review, a small number of recent studies have looked at the acceptability of LNS products for PLWs. The evidence indicates that existing RUTF formulations may not be acceptable to malnourished PLW women (Ali et al 2013), while a number of new formulations were all found to be acceptable in home use trials in Bangladesh (Malay et al 2012). These formulations are now being evaluated in a Randomised Controlled Trial (RCT) in Bangladesh for their effectiveness (against iron/folic acid and MNPs) in preventing chronic undernutrition in children, improving nutrition among PLW in Bangladesh and on the developmental outcomes of their children (FANTA website 2013). FANTA is also assessing; the willingness of households to pay for LNS and MNPs, the relative and absolute cost, the cost-effectiveness of each approach, and public and private benefits of LNS and MNP use. For HIV-infected breastfeeding women, LNS has been found to be acceptable and to reduce weight loss (Kayira et al 2012).

Although nutrition education and counselling (NEC) is commonly carried out for PLWs as part of emergency nutrition programmes, little work has been done on measuring its impact either as stand alone, or in combination with other interventions. For the non-emergency context, a Cochrane review (Kramer & Kakuma 2010) indicated that increased energy intakes were found among women receiving nutritional advice. A later review (Webb-Girard & Olude 2012), albeit noting the poor quality of the evidence, concluded that NEC led to improved outcomes such as, gestational weight gain, increased birth weight and

²⁶ A corn/wheat/rice soy blended food fortified with vitamins and minerals and providing 752-939 kcal, 31-38g protein (16%), 16-20g fat (19%) per 200g daily ration

²⁷ Note that many countries buy directly from the suppliers therefore these figures are an underestimate of the UNICEF's actual procurement of the product.

²⁸ personal communication

²⁹ Based on the current USAID/USDA specifications for exported food aid commodities used in emergency settings

³⁰ Same formulation for both PLW and children but different quantities (two 'doses' for PLW and one 'dose' for children)

reduced anaemia risk in late pregnancy. The effect of NEC was greater when provided with nutrition support, e.g. food or micronutrient supplements or nutrition safety nets, and the review called for more research on this.

6.4 Monitoring

As noted above routine monitoring of performance of maternal supplementation programmes is lacking. A recent initiative of the GNC, to draft Nutrition Cluster indicators for monitoring in emergency programmes includes some disaggregation of intervention level indicators for the PLW target group. This initiative offers some potential for inclusion of a few simple indicators to assess the adequacy of some key maternal nutrition interventions.

This literature search identified only a few additional research studies being conducted that are specific to maternal nutrition in the emergency context. However, an extensive review of agency research agendas was not conducted. One exception was a FANTA study which is underway, aiming to build the evidence base for standard cut-offs for MUAC to identify SAM and MAM in adults and adolescents (including PLW).

6.5 Financing

No information could be found specifically relating to funding for maternal nutrition in emergencies. A review of how nutrition concerns were reflected in the humanitarian appeals process between 1992 and 2009 (Webb 2009) does not mention women at all, although promotion of exclusive breastfeeding is covered. The more recent ACF review of aid for nutrition (ACF 2012b) takes the *Lancet* 2008 maternal and child nutrition series as the basis for the package of interventions for which funding streams were investigated; however no data or analysis was available/presented that was disaggregated by target group.

KEY POINTS - *What is being done: Interventions, monitoring and financing during emergencies*

- Mapping of supplementary feeding conducted in 2012 has helped identify where, and how many, PLW women are being reached globally with what type of assistance;
- Performance data for supplementary feeding targeting women was however insufficient to analyse; a recurring theme for studies looking at outcomes of emergency interventions for women, including those using nutrition education and counselling (NEC) techniques (despite the frequency of these strategies being deployed);
- Existing supplementary foods commonly used for women have not been tailored to their specific needs (nutritional and practical). Use of Lipid-based Nutritional Supplements (LNS) for women is a relatively new area where research is currently being conducted;
- Routine monitoring data of these programmes is in general lacking;
- No financial information on funds allocated to maternal nutrition in emergencies was found during the literature search.

7. KEY GAPS

Much of the evidence presented above is derived from efficacy trials as opposed to effectiveness studies and hence variations exist in estimates of effect size for interventions. In many cases the feasibility and effectiveness of interventions for maternal nutrition in the emergency context is not well known. As for many nutrition interventions in this context, few robust assessments have been done for maternal nutrition, either in programme settings or in diverse emergency contexts and available data from observational studies are usually context-specific and therefore limited. Timing of interventions for

maternal nutrition i.e. at what stage of pregnancy or pre-pregnancy supplementation occurs, also complicates the comparison of research evidence.

Given the above, some specific knowledge and guidance gaps include:

- How should maternal nutrition be reflected at assessment and response analysis stage?
- Who to target? Which maternal anthropometric and demographic characteristics should be used, if any, for inclusion into nutrition interventions, and for discharge?
- What to do?
 - o Strengthen the evidence base for nutrition specific interventions in programmatic contexts;
 - Supplementary feeding for PLWs – the effectiveness/appropriateness of targeting to the ‘malnourished’ versus targeting all – and in particular for adolescents.
 - Evidence on the implications, for the lactating mothers themselves, of their nutritional needs not being met. Gather evidence and experience of interventions to support lactating women’s nutrition.
 - Micronutrient supplementation – how to ensure the best compliance in emergency contexts?
 - Further investigation of the evidence of implications of maternal and child EFA deficiency and potential for supporting EFA intakes in emergencies.
 - What BCC for nutrition is possible and appropriate in emergency contexts and what are the effective delivery mechanisms?
 - o Strengthen the evidence base for nutrition sensitive interventions;
 - Overcome the lack of evidence for nutritional outcomes in general and in particular for maternal nutrition – how can we collect sufficiently robust evidence in the programmatic context?
 - Role of psychosocial and women’s mental health services in supporting maternal and child nutrition. What successful models of emergency interventions exist and how can we build on them?
- How to do it?
 - o Strengthen the evidence base for effectiveness of combined packages of maternal nutrition interventions e.g. iron supplementation plus food, psychosocial support plus nutrition inputs, BCC plus nutritional support;
 - o Which delivery mechanisms are most effective? What operational links with ANC services are needed?
- What to use?
 - o What specific products to use (what should be recommended in which context) for micronutrient supplementation and for supplementary feeding?
- How to monitor? What monitoring is appropriate and feasible for on-going monitoring of intervention effectiveness, and evaluation of impact e.g. for PLW, and for their children?

8. CONCLUSION

This review has summarised the available literature relating to; women’s particular nutritional vulnerabilities, what the implications of these are for women and their infants, current international guidance on maternal nutrition and what is currently being done in emergency programming. A series of key gaps have been highlighted as a result.

To discuss the issues highlighted in this paper, particularly in terms of the identified gaps and to develop key recommendations, a technical round table discussion is being held in Brussels in November 2013. A report of the meeting follows in the next section, as an accompaniment to this technical background paper.

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