



Identification of Gaps and Priority Interventions for Maternal Nutrition in Nepal: A Review



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Identification of Gaps and Priority Interventions for Maternal Nutrition in Nepal A Review

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*Prof Madhu Dixit Devkota
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Executive Summary

The efforts made by the Government of Nepal in addressing micronutrient deficiencies; particularly the Vitamin A supplementation program, salt iodization and iron supplementation to reduce anaemia during pregnancy have been much appreciated. However, it has yet to put in place effective programs at scale to address “general malnutrition” which manifests itself in low body mass index (BMI) for women, low birth weights, underweight, stunting and wasting in children. In spite of the central role that the mothers play in the health and well-being of her children, surprisingly little attention has been placed in the health care sector on the nutrition of the mother beyond iron-supplementation and monitoring weight gain during pregnancy. With a significant proportion (18 percent) of women having low body mass index, there is a need to identify effective interventions that would accelerate the pace of improvement in maternal nutrition in the country. Unfortunately however, both global and Nepal evidence on what works for maternal nutrition is lacking.

In this context, this review was undertaken with the objectives; to review maternal nutrition status and trends in the country, to identify the gaps in existing programmes /interventions and to suggest effective strategies that would address not only the manifestations of maternal under-nutrition but also the determinants. The process comprised of desk review and incorporation of some field experiences through interviews with stakeholders (female community health volunteers, nurses and journalists).

The review shows that maternal under-nutrition which includes deficiency in both energy and micronutrients affects many women of reproductive age in the country. According to Nepal Demographic and Health Survey 2011, 18 percent of mothers suffer from chronic energy deficiency (BMI <18.5), and 12 percent of them are short; both are associated with poor birth outcome and obstetric complications. The initial gains in anaemia reduction have not sustained and currently almost half (48%) of pregnant women and a third of the mothers and their children in Nepal are anaemic. Improvement noted in Vitamin A status and 80 percent of the households use adequately iodized salt. It is interesting to note that an additional 14 percent of women in Nepal are obese (BMI \geq 25) and as a result, Nepal should therefore be gearing to address the “double burden of malnutrition” in the days to come.

The review covers the causal analysis and the life cycle perspective, while food beliefs, practices and intra-household food distribution patterns add Nepali flavour to the causes of maternal under nutrition. The existing interventions to address maternal under nutrition from the government sector, along with other programmes with possible implications on maternal nutritional status like the antenatal care, birth preparedness package and family planning are looked through the nutrition lens. Some recent pilot studies, and the global context and evidence bases that would have bearing on future endeavours to address maternal under nutrition in Nepal is followed by the recent developments in the nutrition sector in Nepal, including the mutli-sectoral plan that is currently in the process of being endorsed.

This review has identified the gaps in existing interventions to address maternal under nutrition ranging from gaps in policy and strategy to the programs. The policy related gaps include less emphasis on food based approaches for addressing nutrition problems, lack of continuum of care both through life cycle as well as home and health facility; little idea among policy makers technical experts about what could work at scale to improve maternal under nutrition, urban nutrition, challenges with designing strategies to address the needs of socially excluded women and families in an equitable manner. Likewise, the gaps in institutional arrangements and capacity including the poor coordination mechanism to address the continuum of care for nutrition and lack of appropriate human resources to effectively deliver nutrition services to the people at different levels are described. Iron and folic acid supplementation during pregnancy and post-partum period has been going on for a long time, however, its low coverage and compliance remains low, particularly during the post-partum period. Similarly, the other programmatic gaps include- post-partum Vitamin A supplementation, weak nutrition education and counselling, reaching the most vulnerable population groups (groups at risk) of mothers and children, urban nutrition- in the light of recent and continuing growth in urban areas, status of women and integration of gender equality and social inclusion issues, and low adequate household iodine consumption in Hill and Mountain districts.

Based on the review, it is recommended that there is a need for comprehensive and sustainable approaches which takes into account the need of adolescents and incorporates continuum of care approach both across the life cycle as well as from home to health facility and beyond. Promotion of local foods and prevailing good cultural practices in the community must be incorporated in the forthcoming national nutrition policies and programs. Social and economic reforms to promote equity among the indigenous communities must be focused to prevent malnutrition in the long run. Coverage and compliance of existing supplementation programs on iron, folic acid and deworming during pregnancy and lactation needs to continue as an interim strategy; coupled with improvement in diet and dietary diversification through nutrition education and counselling. This calls for capacity enhancement of the current and future staffs at national, regional and national levels. Coordination and interaction amongst the various division, departments and centres which is vital to improve program effectiveness in terms of human resource development, avoidance of duplication, optimal use of resources and standardization of training, and communication activities are also recommended.

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Acronyms

ANC	Ante natal care
ANM	Auxiliary Nurse Midwife
BMI	Body Mass Index
CEDAW	Committee on the Elimination of Discrimination against Women
CHD	Child Health Division
CRC	Convention on the Rights of the Child
DALYs	Disability Adjusted Life Years
DoHS	Department of Health Services
EDP	External Development Partners
FAO	Food and Agriculture Organization of United Nations
FCHV	Female Community Health Volunteer
FGD	Focus Group Discussion
FHD	Family Health Division
FHS	Family Health Survey
GESI	Gender and Social Inclusion
GoN	Government of Nepal
HMIS	Health Management and Information System
ICESCR	International Covenant on Economic, Social and Cultural Rights.
IDA	Iron Deficiency Anaemia
IDD	Iodine Deficiency Disorder
IFA	Iron and Folic Acid
IMNMP	Intensification of Maternal and Neonatal Micronutrient Program
IQ	Intelligence Quotient
IU	International Unit
LBW	Low Birth Weight
MCHC	Mother and Child Health Care
MDG	Millennium Development Goal
MIRA	Mother and Infant Research Activities
MIYC	Maternal Infant Young Child
MoAC	Ministry of Agriculture and Cooperatives
MoE	Ministry of Education
MoHP	Ministry of Health and Population
MoLD	Ministry of Local Development
MoPPW	Ministry of Planning and Physical Works
MSNP	Multi Sectoral Nutrition Plan
NDHS	Nepal Demographic and Health Survey
NPC	National Planning Commission
NFHS	Nepal Family Health Survey
NHEICC	National Health Education Information and Communication Centre
NLSS	Nepal Living Standards Survey
NMSS	Nepal Micronutrient Status Survey
NNCC	National Nutrition Coordination Committee

NPC	National Planning Commission
NRH	Nutrition Rehabilitation Home
NUTEC	Nutrition Technical Committee
ORC	Outreach Clinic
PEM	Protein Energy Malnutrition
PNC	Post Natal Care
SAARC	South Asian Association for Regional Cooperation
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
Vit A	Vitamin A
WFP	World Food Programme

Chapter 1

Introduction

1.1. Background

Maternal under-nutrition, which includes deficiencies in both energy and micronutrients, affects the majority of women living in resource-poor settings. In some countries in sub-Saharan Africa and Asia where maternal under-nutrition is a serious problem, more than 20% of women may have a body-mass index of less than 18.5 kg/m².⁵ Chronic under-nutrition has also meant that in some countries more than 10% of women aged 15–49 years are of short stature, of less than 145 cm. Poor maternal nutrition not only has negative consequence on a woman's health, it affects her chances of surviving pregnancy, and greatly impacts on her child's health; since pregnancy and lactation are periods of heightened nutritional vulnerability for both the mother and her baby.

Globally more than 3.5 million mothers and children under five die unnecessarily each year due to the underlying causes of under nutrition, and millions more are permanently disabled by the physical and mental effects of poor dietary intake in the earliest months of life. By 24 months of age, if undernourished, children could suffer irreversible physical and cognitive damage, impacting their future health, economic well-being, and welfare. The adverse consequences of insufficient nourishment may continue into adulthood and be passed onto the next generation as these undernourished girls and women have children of their own. Therefore, the threat of malnutrition begins in the womb and continues throughout the life cycle. A mother who was malnourished as an infant, young child or adolescent is more likely to enter pregnancy malnourished; her compromised nutritional status then affects her own health as well as that of her child.

An analysis of the causes of stunting among children in Nepal reveals that around half of it is rooted in poor maternal nutrition and the other half in poor infant and young child nutrition. Around a quarter of babies are born low birth weight, and as per findings of Nepal Demographic and Health Survey⁶, 41 percent of children below 5 years of age are stunted, 29% of the children are underweight and 11 % are wasted. The survey also found that malnutrition is not evenly distributed throughout the country but varies both ecologically and regionally, stunting, underweight and wasting are more common in mid and far west hills and mountain areas than other parts of the country; while all three indicators are poor in the central Terai.

Nepal has been hailed for its effort in addressing micronutrient deficiencies, particularly the Vitamin A supplementation program, salt iodization and iron supplementation to reduce anaemia during pregnancy. However, it has yet to put in place effective programs at scale to address “general malnutrition” which manifests itself in low body mass index (BMI) for women,

⁵Black RE, Allen LH, Bhutta ZA, et al. For the Maternal and Child Under nutrition Group. Maternal and child under nutrition: global and regional exposures and health consequences. *Lancet*.2008; Published Online January 17. DOI:10.1016/S0140-6736(07)61690-0.

⁶Ministry of Health and Population (MoHP) Nepal, New Era, and ICF International Inc. 2012. Nepal Demography and Health Survey, 2011. Kathmandu, Nepal: Ministry of Health and Population, New Era, and ICF International, Calverton, Maryland.

low birth weights, underweight, stunting and wasting in children. Furthermore, effective and self-reliant measures are needed to ensure sustainability of the reduction in micronutrient deficiencies. In spite of the central role that the mothers play in the health and well-being of her children, surprisingly little attention has been placed in the health care sector on the nutrition of the mother beyond iron- supplementation and monitoring weight gain during pregnancy. With a significant proportion (18%) of women having low body mass index, there is a need to identify effective interventions that would accelerate the pace of improvement in maternal nutrition in the country. Unfortunately however, both global and Nepal evidence, on what works, is lacking for maternal nutrition. In this context, this review was undertaken with the following objectives:

1.2. Objective of the Review

- To review maternal nutrition status and trends in the country
- To identify the gaps in existing programmes /interventions
- To suggest effective strategies that would address not only the manifestations of maternal under-nutrition but also the determinants.

1.3. Expected Output

- Documentation of maternal nutrition status, trends and beneficial local practices
- Identification of priority interventions for accelerating improvement in maternal nutrition.

1.4. Process

The process comprised of desk review of existing policy, strategy and programs of Nepal government and programs supported by external development partners. Evidences available from international journals and other sources were reviewed rigorously. Similarly, incorporation of field experiences accrued through field visit in different parts of the country in different indigenous communities. Observation of cultural practices associated with maternal, infant and young child feeding was done during the field visits. The other method of information collection of the study was interview with different stakeholders at community level (female community health volunteers), health institution level (nurses and other health workers) and district level (journalist) in numerous locations by the team that comprised of Dr Aruna Uprety, Mr. Narayan Subedi, Mr. Rajan Paudel and coordinated by Dr. Madhu Dixit Devkota.

The total duration of the study was of five months starting from November 2011 to March 2012.

1.5. Organisation of Report

The report comprises of eight chapters: the first is introduction that includes the objective and the expected outputs of the review; the second chapter describes maternal nutrition status and trends in Nepal where food beliefs, practices and intra-household food distribution patterns add Nepali flavour. The causal analysis and the life cycle perspective are dealt with in chapter three;

chapter four deals with the existing interventions to address maternal under-nutrition from the government sector; some other important governmental programmes with possible implications for maternal nutritional status (antenatal care, birth preparedness package and family planning) are looked through the nutrition lens and some recent pilot studies are also incorporated. The global context and evidence base that would have bearing on future endeavours to address maternal under-nutrition in Nepal are discussed in chapter five. Chapter six captures the recent interest and developments in nutrition, including the multi-sectoral nutrition plan that is ready for endorsement by the government and being rolled out. The existing gaps in programme and recommendations follow in chapters seven and eight respectively.

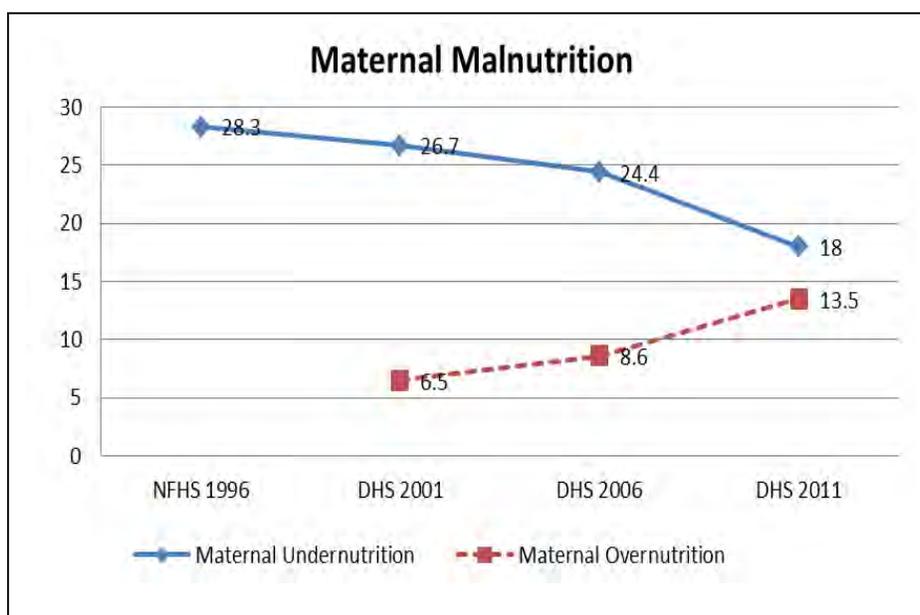
Chapter 2

Maternal Nutrition Status and Trends

2.1. Maternal Under-nutrition

Over the last decade, reduction in maternal under-nutrition have been disappointing; despite significant reduction in other indicators like maternal mortality which have halved or more, maternal under nutrition rates have declined only by 10 percentage points between 1996 and 2011 as shown in figure 1.

Figure 1: Changes in nutritional status of women (1996-2011)

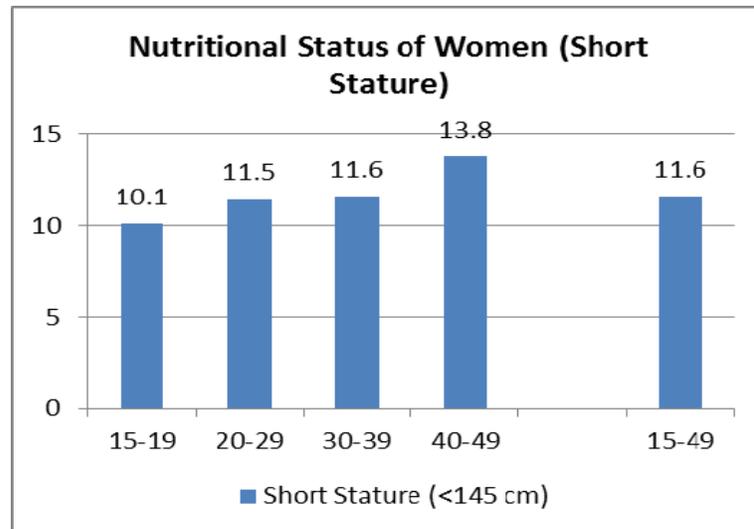


Maternal under-nutrition is assessed by measuring the weight and height of women. Short stature (height less than 145 cm) reflects poor socio-economic conditions and inadequate nutrition during childhood and adolescence, due to chronic energy deficiency. Short stature additionally carries the risk for difficulties during delivery, obstetric complications and poor birth outcomes, including low birth weight. Body mass index (BMI) is the measure for thinness and obesity; a BMI below 18.5 kg/m² indicates thinness or acute under-nutrition and a BMI of 25 kg/m² or above indicates overweight or obesity. A BMI below 16 kg/m² indicates severe under-nutrition and is associated with increased mortality. Low pre-pregnancy BMI, as with short stature, is associated with poor birth outcome and obstetric complications.

National surveys, quite consistently indicate high prevalence of chronic energy deficiency among women of reproductive age group. Nepal Family Health Survey (NFHS) in 1996 identified that 15% of Nepalese mothers had short stature while the DHS 2011 shows that 11.6 percent of Nepali women are shorter than 145 cm. As shown in figure 2, the adolescents are better (10%) compared to older women, while women in rural areas (12%) fair worse than urban areas (8%).

There is regional disparity with women in the Far-western region least likely (6.5%) while Eastern mountain sub region has the highest (15.5%) of women under 145 cm. The likelihood of being shorter than 145cm decreases with a rise in level of education and wealth quintile.

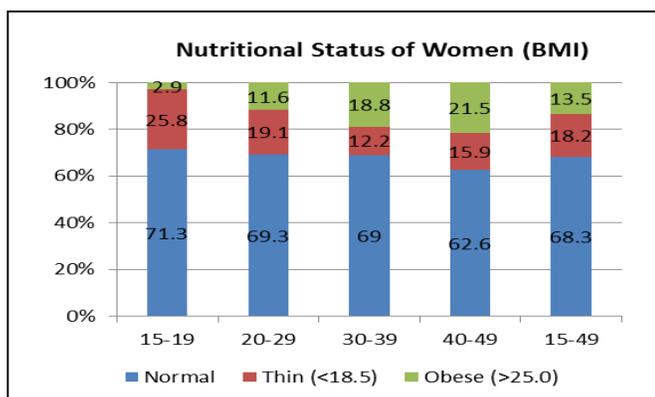
Figure 2: Nutritional status of women (Short Stature)



The mean BMI among women age 15-49 is 21.4 kg/m². Mean BMI generally increases with age. Urban women have a slightly higher mean BMI (22.7kg/m²) than rural women (21.2 kg/m²). There are only small differences in mean BMI among women living in the mountain, hill and terai ecological zones. Variations by development region are minimal, and the mean BMI not found to correlate with women’s level of education. With regard to wealth, mean BMI shows a steady increase from 20.4 kg/m² among women in the lowest wealth quintile to 23.2 kg/m² among those in the highest quintile.

As shown in figure 3, eighteen percent of women of reproductive age are thin or undernourished (BMI <18.5 kg/m²). The proportions of mild thinness (17.0-18.4 kg/m²) and moderate and sever thinness (<17 kg/m²) are 12 percent and 7 percent respectively. Despite the absence of a linear correlation with age, the data show that adolescents (age 15-19) are most likely to be thin (26%). Rural women are more likely to be thin (19%) than urban women (14%). The proportion of women in the terai who are thin (23%) is almost double the proportion in the hill zone (12%). A notably higher percentage of women in the Far-western development region (24%) than in the Western region (14%) are thin. Among sub-regions, the highest proportion of thinness is the Central terai sub-region (26%) and the lowest is in the Western hill sub-region (8%). Thinness is more common among women with no education (23%) than among women with an SLC and higher level of education (15%). Women in lowest wealth quintile are more likely to be thin (22%) than women in the highest wealth quintile (12%).

Figure 3: Nutritional status of women (BMI)

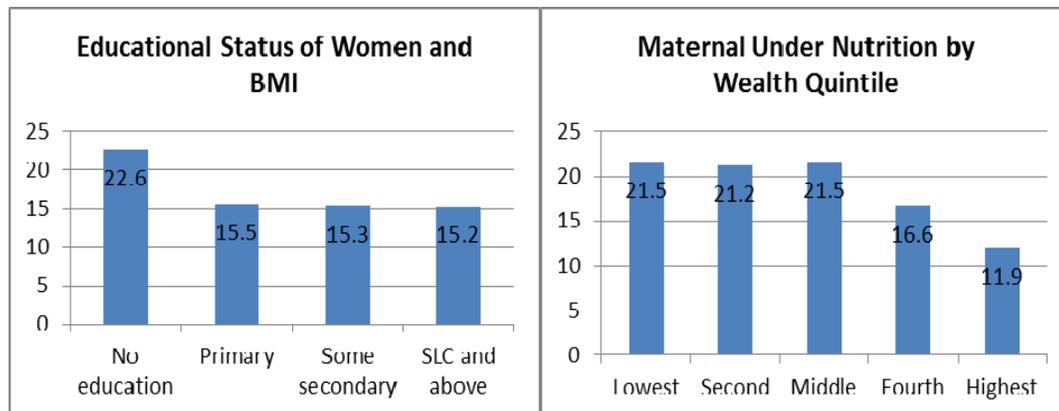


Additionally, the DHS 2011 shows that 11 percent of women (15 to 49 years) are overweight (BMI 25-29 kg/m², and 2 percent are obese (BMI 30kg/m² or above). The prevalence of overweight/obesity had increased 5 percentage points since 2006. Younger women are less likely than older women to be overweight or obese. Urban women are more likely to be overweight/obese (26 percent) than rural women (11 percent). Obesity is positively correlated with wealth quintile: the proportion of overweight/obese women increase steadily from 3 percent in the lowest wealth quintile to 30 percent in the highest wealth quintile. Given the changing profile of the non-communicable diseases, future linkages would need to be established with the efforts being made to address them in Nepal.

As shown consistently by various DHS surveys, maternal under nutrition is also closely correlated with maternal education and poverty (Figure 4). Mothers with no education are more likely to have low BMI compared to mothers who have completed schooling. Improvements in maternal education have occurred in line with other social developments in Nepal. In 2011, 39.7 percent of Nepali women aged 15-49 had no education, compared to more than half (53.1%) in 2006 and 73 percent in 2001. Maternal under nutrition was also higher in the lower wealth quintiles compared to the highest as shown in figure 5.

Figure4: Educational status of women and BMI;

Figure 5: Maternal under-nutrition by wealth quintile



2.2. Micronutrient Status

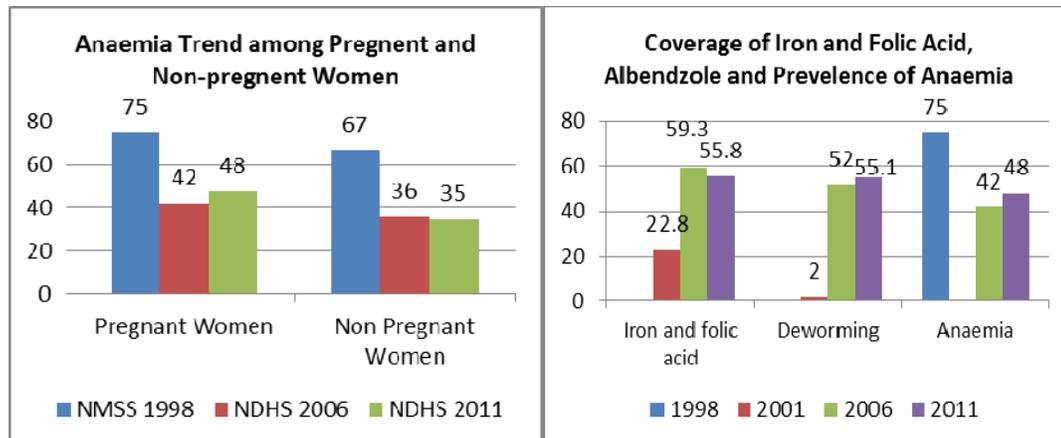
Women of reproductive age are frequently affected by multiple micronutrient deficiencies because nutrient needs are particularly high during periods of maximum growth such as pregnancy and lactation. Iron, Vitamin A, Iodine and Zinc are considered below:

2.2.1. Iron Deficiency Anaemia

According to NDHS 2011, thirty-five percent of women aged 15-49 in Nepal are anaemic, with 29 percent mild, 6 percent moderate, and less than 1 percent severely anaemic. Prevalence of anaemia is associated with maternity status, 48 percent pregnant women are anaemic, compared to women who are breast feeding (39%) and women who are neither pregnant nor breast feeding (33%). Anaemia is more prevalent in rural areas (36%) than urban areas (28%) while it is higher in terai (42%) compared to mountain and hills (27%). Unfortunately, the dramatic decline in anaemia seen earlier has not been continued in 2011.

Figure 6 below, presents the data regarding the iron, folic acid and de-worming coverage^{7,8,9} and the prevalence of anaemia. With an increase in coverage of iron, folic acid and de-worming, the prevalence of anaemia has decreased; however, this level of anaemia among the women makes it still a public health problem.

Figure 6: Anaemia trend among pregnant and non-pregnant women, Figure 7: Coverage of iron and folic acid, albendazole and prevalence of anaemia



2.2.2. Vitamin A Deficiency

The most recent data on vitamin A status is from the 1998 Nepal Micronutrient Status Survey. This survey found that 4.7 percent of women were night blind (16.7% in their last pregnancy) and 0.27 percent and 0.33 percent of pre-school age children had night blindness and Bitot's

⁷Ministry of Health Nepal, New ERA, and ORC Macro. Nepal Demographic and Health Survey (NDHS); 2001.185-190.

⁸Ministry of Health and Population Nepal, New ERA, and Macro International Inc. Nepal Demographic and Health Survey (NDHS); 2006.192-195.

⁹Ministry of Health Nepal, New ERA, Micronutrient Initiative, UNICEF Nepal and WHO. Nepal Micronutrient Status Survey (NMSS); 1998.

spots respectively. Additionally, 16.6 percent and 32.3 percent of women and pre-school aged children respectively had sub-clinical vitamin A deficiency as measured by serum retinol rates $<0.70\mu\text{mol/l}$. WHO categorizes a level of night blindness above 5 percent as 'moderate' and a prevalence of low serum retinol >10 percent as moderate and >20 percent as severe.¹⁰ By these definitions therefore, Nepal had moderate vitamin A deficiency in women and severe deficiency in pregnant women and young children in 1996. In contrast, the DHS 2006 reports that only 5.2 percent of women had night blindness in their last pregnancy, suggesting an improvement in vitamin A status in women. DHS 2011 showed that only 40 percent women received Vitamin A during postpartum period, a slight difference was also seen among women who received postpartum Vitamin A by urban and rural residence (46% and 40%) respectively. Similarly, women with SLC and higher education were more than twice as likely as mothers with no education to have vitamin A supplementation (62% and 28%) respectively.

2.2.3. Iodine Deficiency Disorder

Iodine deficiency is associated with an average 13.5 point reduction in IQ for a population. Deficiency in school children leads to reduced cognitive functions. Women of reproductive age are often most affected. Iodine deficiency is related to adverse pregnancy outcome such as abortion, fetal brain damage, stillbirth, perinatal death and irreversible effects on the child's brain development and mental capacity, in the form of cretinism. Nepal has managed to address the problem of iodine deficiency through universal salt iodization as a sole strategy; the median urinary iodine levels were found to be 188 $\mu\text{g/L}$ and 202.9 $\mu\text{g/L}$ in 2005¹¹ and 2007¹² respectively; this is slightly above the targeted population range of 100-199 $\mu\text{g/L}$. DHS 2011 shows that 75 percent of women (with a child born in the last 5 years and living in the household that were tested for iodised salt) lived in household with adequately iodised salt (salt with 15 ppm or more iodine). The western region has the highest proportion of women living in households with adequately iodised salt (84%), while the far-western region has the lowest (54%). At the sub-regional level, women in the western terai subregion are most likely to live in households using adequately iodised salt (91%), while women in the far-western hill sub-region are least likely to live in such households (42%). The proportion of women living in households using adequately iodised salt is positively related to educational level and wealth status.

2.2.4. Zinc Deficiency

Another micronutrient of interest is Zinc, as its deficiency impairs innate and acquired immunity¹³. Zinc deficiency also has direct effects on the gastrointestinal tract that lead to an

¹⁰WHO. Nutrition Landscape Information System (NLIS) Country Profile Indicators: Interpretation Guide. 2010

¹¹MOHP, MI, New Era. Nepal Iodine Deficiency Disorders Status Survey 2005

¹²Govt of Nepal, Govt of India, Alliance Nepal. National Survey and Impact Study for Iodine Deficiency Disorders and Availability of Iodized Salt in Nepal 2007

¹³Shankar, A. H. and Prasad, A. S., Zinc and immune function: the biological basis of altered resistance to infection, *American Journal of Clinical Nutrition*, 68 (supplement 2), 1998, pp. 447S-463S.

increased clinical severity of acute enteric infections¹⁴. As a result, zinc deficiency increases the risk of mortality from diarrhoea, pneumonia and malaria by 13 to 21 percent¹⁵. Zinc deficiency may also negatively affect growth as growth retarded children respond well to zinc supplementation¹⁶. Zinc deficiency often co-exists with iron deficiency.

Unfortunately, no national data is available on zinc or folic acid deficiency. A small study in Bhaktapur in 2000 found high levels of zinc deficiency in otherwise healthy women. The deficiency was associated with intake of phytate but not with dietary zinc implying that although women may consume zinc through their foods, high levels of phytate in the food, which bind zinc, were causing the zinc to be unavailable and so contributing to deficiency.¹⁷

2.3. Food Security

The poor nutritional situation in Nepal is often attributed to chronic food insecurity coupled with economic and geographic inequities. The term "food security" refers to the ability of a country to assure adequate food supply for its current and projected population. The World Food Summit in 1996 defined food security as a situation in which "all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". FAO provided the link between food, nutrition and health by advocating food security should be assessed taking into account:

Availability (agricultural production, its determinants and availability to households);

Access (household and individual's access to food, poverty and literacy levels, vulnerability of populations); and

Absorption (optimal absorption and utilization of food).

Nepal's population growth rate has outstripped cereal production growth and domestic cereal supply is reportedly not sufficient to meet national needs. Data from the Statistical Year Book of Nepal 2007 indicates that 49 out of the 75 districts in the country were "food deficit" in 2005/2006 based on production data and the Food Security Atlas of Nepal¹⁸ reports that 44 districts were marginally to severely food deficit in the period 2007-2009. Terai, traditionally the bread basket of Nepal, has had declining production vis-à-vis requirements since 2004. Reasons for the insufficient domestic production include the small proportion (16%) of total land under agriculture and low yields per hectare, which are the result of insufficient inputs (irrigation, improved seeds, fertilizer, pesticides and mechanization), and preponderance of small

¹⁴Roy, S. K. and Tomkins, A. M., Impact of experimental zinc deficiency on growth, morbidity and ultrastructural development of intestinal tissue, *Bangladesh Journal of Nutrition*, 2, 1989, pp. 1-7

¹⁵Caulfield, L. and Black, R. E., Zinc deficiency, in Ezzati, M., Lopez, A. D., Rodgers, A. and Murray, C. J. L. eds., *Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors*, World Health Organization, Geneva (in press), 2003.

¹⁶Brown, K. H., Peerson, J. M., Rivera, J. and Allen, L. H., Effect of supplemental zinc on the growth and serum zinc concentration of prepubertal children: a meta-analysis of randomized controlled trials, *American Journal of Clinical Nutrition*, 75, 2002, pp. 1062-71.

¹⁷Chandyo et al. Zinc deficiency is common among healthy women of reproductive age in Bhaktapur, Nepal. *Journal of Nutrition*. 2009

¹⁸Food Security Monitoring Task Force, National Planning Commission. Food Security Atlas of Nepal July 2010

landholdings. The shortfall in domestic production has been offset by an increase in food imports, primarily from India. By all accounts, a significant proportion of the Nepali population have problems with food access as a result of prevailing high levels of poverty, even though food may be available; they are unable to purchase adequate amounts of food or an adequate diversity of foods. High poverty is compounded by poor physical access due to insufficient markets and roads and high transport costs for food shipped to remote areas.

The per capita energy intake of Nepali women has increased from 2259 to 2349 cal/person/day; similarly, protein consumption has increased from 57 to 60 gm/person/day and fat from 37 to 40 gm/person/day.¹⁹ However, there is insufficient focus on the cultivation and consumption of low-cost, locally available green leafy vegetables, yellow vegetables and fruits. Health and nutrition education emphasizing the importance of consuming these inexpensive but rich sources of micronutrients should be stressed at the household level. Similarly, food beliefs and practices and intra-household food distribution patterns have bearing on maternal under nutrition and would now be discussed.

2.3.1. Food Beliefs and Practices of Mothers

*Culture has a strong impact on food behaviours. Food, habits and practices are closely related to the typical behaviours of the particular group that people belong to. People tend to follow codes of conduct in relation to food choice, methods of food preparation and eating, number of meals eaten per day, time of eating, and the size of the portion eaten.*²⁰ A focus group discussion about fruit and vegetable consumption patterns was carried out by N. Khadka²¹ in three villages, two in the Hills and one in Terai. The villagers' at all three sites contend that "no one has to teach us to eat fruit and vegetables as they eat them during their seasons." Similarly, vegetables were regarded as a part of their meals but were eaten to "add taste to meals." Similarly, a study carried out in Chepang community of Makwanpur district had found that despite mother's poor knowledge on feeding they were found feeding their child well.²²

A large number of studies and surveys conducted in Nepal with a focus on maternal and child health have collected information on cultural practices as they affect nutrition. A review by J Singh²³ in 1998 summarized findings from such studies up through 1997, which are as follows:

- Many believe that pregnancy is a natural condition that does not need any particular attention.
- Any special treatment of mothers tends to be for the protection of the unborn child rather than for her own health and wellbeing.

¹⁹FAO Statistical Yearbook, 2010, Table D.1

²⁰Barasi, E. and R. F. Mottram. *Human Nutrition*, London, Edward Arnold, 1990.

²¹Khadka, N. B. —Culture: A dynamic process of social behaviour, *International Journal of Language, Society and Culture*, 2000.

²²Subedi N, Poudyal AK, Rana T, Paudel S. *Correlates of Infant and Young Child Feeding Practices in Chepang community, Makwanpur, Nepal. Unpublished thesis, Tribhuvan University, 2010.*

²³ Singh, J. *A review of the literature on practices and beliefs regarding maternal and infant/child nutrition in Nepal.* Kathmandu Academy for Educational Development, June 1998.

- One widely held belief is that if a woman eats more during pregnancy she will have a bigger baby which can cause problems during labour.
- Foods of animal sources are considered good for pregnant women.
- Social factors also influence the diet of pregnant women: women and girls usually eat after male members and children have eaten and have less access to food from animal sources and other special foods.
- Mothers who have recently delivered a baby are considered impure and are not allowed to eat with other family members until the purification ceremony has been held. In some communities, mothers' food intake is limited during this period.
- Women in mid and far western hill regions practice a system in which the recently delivered women are kept in the cowshed outside their homes in very unhygienic conditions.
- In some cultures, it is believed that a connection between stomach and womb exists and womb and stomach are rested together by not giving food to the mothers.
- Ghee, meat, and milk are considered good for new mothers for breast-feeding. However, for mothers in many families, the diet for lactating mother is the usual family diet because they can't afford different foods.
- The diet for a lactating mother is further restricted when her baby is ill.

There are many practices that support better nutrition which exist in different communities and ethnic groups. Consumption of *jwano (omum)* soup which is rich in calcium and other micronutrients, providing frequent meals (up to 3 times) during post-partum period, special preparations for birth and feeding among indigenous community during which rice, butter, various spices that would help mother to regain strength are frequently used; oil massage of postpartum mothers to help her regain strength and her psychologically well-being are some worth mentioning.

In the Langtang valley of Rasuwa district, adequately feeding the mother is a part of the culture. Pregnant and lactating women are fed with a special meal consisting of a mix of cereals, eggs, fresh or dried vegetables, meat and cheese. In addition, there is no taboo around menstruation and women eat according to their needs at par with men. Consequently, women enjoy good physical health.²⁴ There are similar practices in other high mountain communities across the country.

2.3.2. Intra-household Food Distribution

In patriarchal societies, it is common for women to eat last and to give the highest quality food to the men. If there is a food shortage, women are more likely to go without food. An annotated bibliography of Food Utilization Practices, Beliefs and Taboos in Nepal found reference to all of the following practices: a hierarchy in the distribution of food with a detrimental effect on maternal nutrition, lower consumption of food by women compared to other members of the

²⁴ PHI; Langtang Health Campaign: Exploration and Action. Kathmandu: People's Health Initiative, 2007

family, particularly during pregnancy, eating down and taboos during pregnancy, and food taboos during lactation.²⁵ Available studies also point to a hierarchy existing in the distribution of food within households that is detrimental to women's food intake. Gittelsohn J²⁶ documented a variety of mechanisms by which some individuals are favoured over others through household food distribution. This includes serving order, serving method, refusing to serve foods, channelling foods, and distributing low-status food for higher-status foods. Adult women were less likely to meet their nutrient requirement for energy, beta-carotene, riboflavin and vitamin C than men of the same age. Women's late position in household serving order, channelling of special foods to males and children, and lower intake of foods accounts for these findings.

To summarize, there is diverse food consumption pattern depending on region, caste and food availability coupled with traditional beliefs and practices pertaining to pure and impure food; hot, cold and neutral foods; beneficial or harmful foods; or curative food makes food consumption a complex issue. Programs aimed at improving the nutritional status of women will have to consider these diverse consumption patterns, beliefs, and inequity in order to inform and advice depending upon local realities.

2.3.3. Access to Health Services and Care Practices

Access to health care, another underlying cause of under nutrition, has improved by most indicators. Although coverage of antenatal care (ANC), skilled delivery and postnatal care are still relatively low, they have been increasing significantly, in particular between 2006 and 2011. The government of Nepal has established free essential health services at the health post and sub-health post levels and targeted free health care in Primary Health Centres and District Hospitals, with plans to expand these interventions up to regional and national health facilities.²⁷

Overall care of women that had shown improvement between 2001 and 2006 appears to have continued to improve in 2011. More women are accessing health services related to pregnancy and delivery and there are small but positive changes in teenage pregnancies and birth intervals as well. According to NDHS 2011, 58 percent of women received antenatal care (an increase of 33% compared to 2006), more women in urban areas (88%) compared to women in rural areas (55%) received ANC; women in mountain (52%) hill (53%) and terai (63%); similarly educated women accessed ANC better (89%) compared to those without education (42%). Women's utilisation of delivery services showed that only 36 percent were delivered by skilled providers and only 28 percent delivered at health facilities. Use of modern contraception has increased from 16 percent in 1996 to 43 percent in 2011. However, only 17.6 percent of those who were less than twenty years were found to use contraceptives as compared to almost 60 percent of those above thirty years.

²⁵ Adhikari RK. Food Utilization Practices, Beliefs and Taboos in Nepal: annotated bibliography. USAID. May 2010

²⁶ Gittelsohn, J. —Opening the box: Intra-household food distribution in rural Nepal. ||*Social Science and Medicine*, Vol. 33(10): 1141–1154, 1991.

²⁷ World Bank. Project Appraisal Document on Proposed Credit and A Proposed Grant to Nepal for a Second NHP and HIV/AIDS Project, March 2010

The maternal care practices are very poor and a quarter of mothers give birth before the age of eighteen. In terms of both pre-natal and post-natal cares, mothers are ill-provided for. Mothers are forced to be involved in household chores including farming immediately after delivery. A quarter of them also smoke that accounted for 30 percent low birth weight (DHS 2006). As for maternal feeding practices, a study found that less than a quarter of mothers were provided with any quality animal protein foods or foods made with oil or fat. Maternal and infant infections are very common and intestinal parasites constitute one of the major public health problems.

In rural areas, women are mostly engaged in household chores as well as agricultural activities and thus have little opportunities to take care of their health and nutritional needs. In urban areas, women have the double burden of kitchen work and child care, and income related works, thus limiting the time available for their own care.

According to NDHS 2011, more people have electricity in their homes (97% in urban and 73% of rural households) as compared to 49.5 percent in 2006 and 24.6 percent in 2001. About 90 percent of households in both urban and rural areas have an improved water source. Half of urban households and 36 percent of rural households use an improved toilet facility. Nevertheless, large proportions of the Nepali population still have no access to these basic standards of living. The majority also reportedly eat vitamin A rich foods, while consumption of iron rich foods remains low. It is not wrong to say that although maternal care has improved, the situation is still far from optimal in many areas.

Voices from the Field

In order to understand the realities of the community health workers and volunteers, focus group discussions were conducted; some excerpts:

- “We are given training to give vitamin A capsule and we do distribute iron and folic acid but we do not discuss with pregnant mothers and the families about local food. We know that it is good to cook in iron pot but we do not tell women about this. If someone would have given us training on nutrition and its value, it would have been better.”

FCHV, Kailali

- “When we were studying, not enough nutrition information was given to us. We were told about vitamin A capsule and the importance of iron and folic acid to pregnant mothers. Importance of locally available foods, feeding children and cultural aspects of food taboos however, were not taught. The two weeks training that I received when I started my work at the Nutritional Rehabilitation Home in Birjung Hospital was an eye opener for me.”

Nurse at NRH, Birjung

- “I do examine pregnant mothers twice a week and distribute Iron and folic acid and tell them to eat nutritious foods like egg, meat etc. But not all our women in this area can afford that and many of them are malnourished. Food which they have like millet, buckwheat etc do not have good protein and vitamins.”

Senior ANM, Bajura

Health journalists were also found to have meager knowledge on importance of food and believed that local food did not provide adequate nutrients. Nutrient value of locally available food such as millet, buckwheat, wheat, and potato etc. were not well known and these foods not valued.

“Rice is very important food and we really need to provide rice to get rid of hunger to people. Other local foods like buckwheat and millet are not as nutritious as rice....!”

FGD with Journalists in Nepalgunj

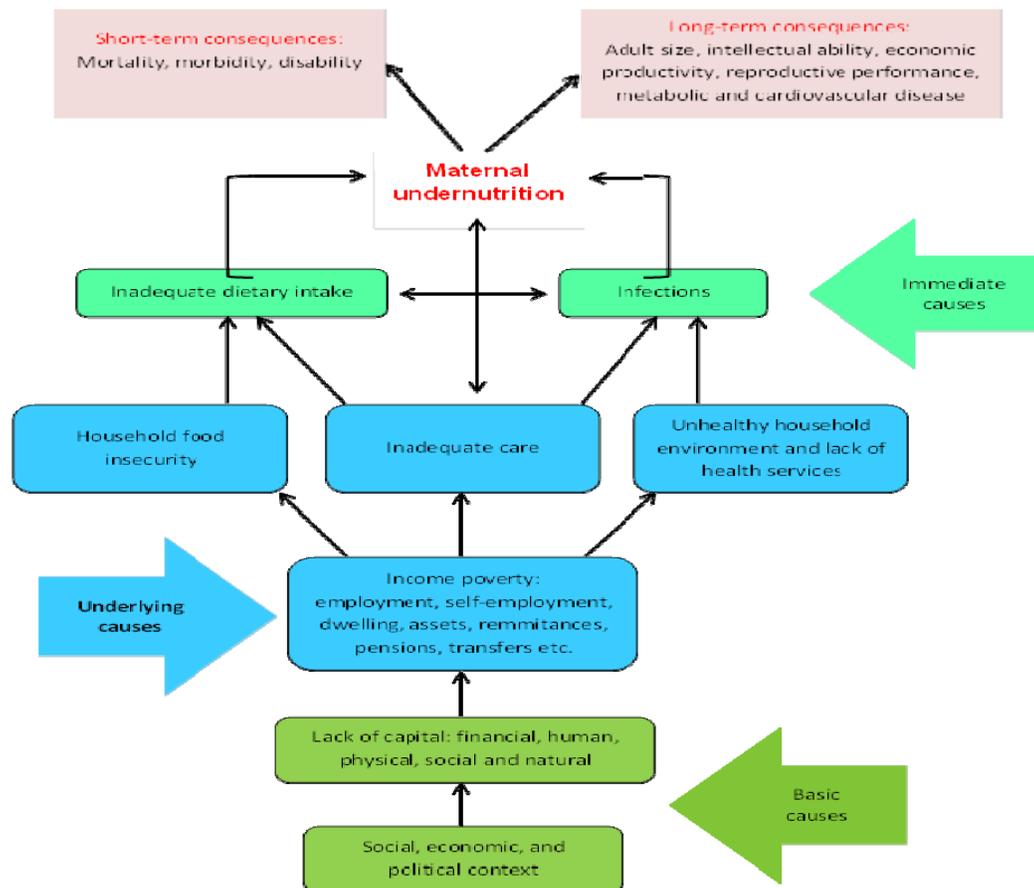
Chapter 3

Causal Analysis of Maternal Under-nutrition

3.1. Conceptual Framework

A conceptual framework of causes of maternal and child under nutrition, developed by UNICEF in the 1990s,²⁸ has largely been accepted as the best way to understand the different causes and different levels of causality of under nutrition (figure: 8).

Figure 8: Conceptual framework for analysing the causes of malnutrition



Ref: UNICEF

This conceptual framework identifies inadequate dietary intake and disease as the immediate causes of under nutrition. At the household/family level, inadequate dietary intake and disease are themselves caused by inadequate access to food, inadequate care practices (such as feeding) and inadequate access to water, sanitation and health services – commonly referred to as food, care and health. These underlying causes at the household level are themselves affected by basic causes at the societal level such as inadequate food supply, income and poverty, maternal

²⁸ UNICEF, *Strategy for Improved Nutrition of Children and Women in Developing Countries*, 1990.

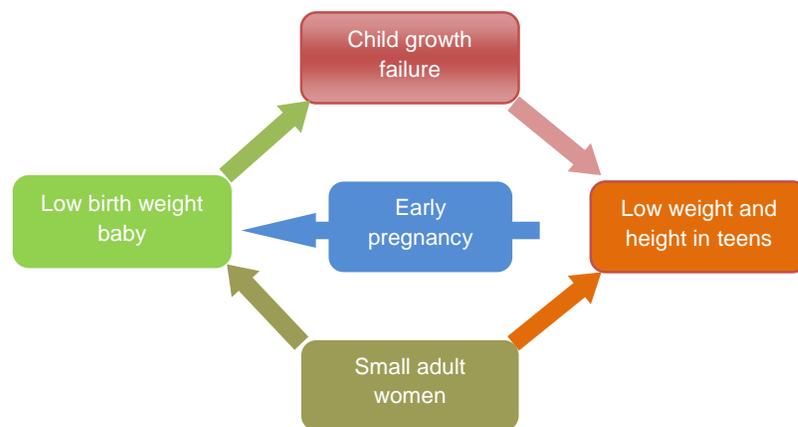
education, investment in health services, infrastructure (roads and water supply), social protection schemes and so on. Thus, for example, access to food at the household level is affected by food availability and access by the community, such as proximity to markets, availability of roads or purchasing power.

On the basis of this conceptual framework, many nutrition programmes throughout the world have focused on addressing the immediate and underlying causes of under nutrition in young children through well-known interventions such as home gardening, food subsidies, breastfeeding counselling, health and nutrition education, vitamin A and iron supplementation, access to iodized salt, child immunizations, clean water and improved sanitation, and growth monitoring and promotion, however, are seriously lacking in interventions that address the basic causes. These now need to be complemented with interventions that address the health and nutrition of women before and during pregnancy, that prevent adolescent pregnancies, and that focus on the reduction of low birth weight and stunting as immediate as well as long-term ways to reduce under nutrition and much attention needs to be accorded to addressing the basic causes of poverty and inequality at societal, community and household level. The additional dimension of intergenerational causality is not adequately reflected in the above framework and therefore shall be dealt in detail under life cycle of under nutrition below.

3.2. Under-nutrition throughout the Life Cycle

As illustrated in figure 9, the diagram of the life cycle, often under nutrition is ‘inherited’: light-weight, short women tend to give birth to small, low birth weight babies, who, since they do not catch up in growth, become short, light-weight girls and women. Such ‘inherited’ under nutrition cannot be fully addressed by post-natal interventions alone. Hence, measures of maternal nutrition (i.e., low caloric intake or pregnancy weight gain, low pre-pregnancy weight and short stature) have become, along with ethnicity, important established indicators of factors that have a direct impact on intra uterine growth retardation (IUGR) in developing countries.²⁹

Figure 9: Intergenerational cycle of growth failure



²⁹ Kramer, M. S., Determinants of Low Birth Weight: methodological assessment and meta-analysis, *Bulletin of the World Health Organization*, 65 (5), 1987, pp. 663-737.

Improving birth weight is extremely important because birth weight has an enormous impact on child growth faltering, child development and final adult height. The causes of stunting are rooted in inadequate foetal growth which is strongly influenced by maternal nutrition and health. About half of the growth failure accrued by two years of age, occurs in utero.³⁰ Despite genetic influences, which account for 40 percent of the variances of birth weight, intrauterine environmental factors are more powerful.³¹ In Asian immigrants to the USA, low birth weight rates were reduced from 15.5 to 8.5 percent (a 46% reduction) within a decade of arrival³², proving that small Asian women can have usual birth-weight babies if the environment is supportive.

The importance of the intrauterine environment is supported by Dobbing's description of 'critical periods' in his studies on brain growth and development two decades ago.³³ A critical period is a period of rapid growth in cell number or in cell size during which cells are especially vulnerable to insult or deprivation. Vulnerability is at its greatest during periods of maximum growth velocity. It is during these maximal periods that the potential for ultimate development is determined. Dobbing applied this concept to cell division and growth in nerve cell numbers in the developing brain and to the later development of cognitive function. The adequacy of circulating levels of iodine at critical periods of brain growth offers a well-known example. The foetus of an iodine-deficient mother can be successfully protected if iodine is given in the first and second trimester of pregnancy. Supplementation in the third trimester or after birth will not prevent the mental deficits.³⁴ The same principle can be applied to critical periods in other growth as well, including linear and weight growth.³⁵

Winnick³⁶ described three phases of foetal growth – phase 1: cellular hyperplasia (increase in cell number), phase 2: hyperplasia with hypertrophy (increase in cell size), and phase 3: cellular hypertrophy. These phases correlate roughly with the trimesters of pregnancy (phase 3).³⁷ Linear growth velocity, defining the critical period of growth in length, reaches its maximum before the 15th week of gestation.³⁸ After that, it drops to a plateau before birth and never rises to the same velocity in postnatal life, (including the short but not as significant surge during adolescence). On

³⁰Karlberg J. A biologically oriented mathematical model (ICP) for human growth. *Acta Paediatrica Scandinavica*. 1989 and Li H et al. Associations between prenatal and postnatal growth and adult body size and composition. *American Journal of Clinical Nutrition*. 2003

³¹Polani, P. E., Chromosomal and other genetic influences on birth weight variation in Elliot, K. and Knight, J., eds., *Size and Birth*, Associated Scientific Publishers, Amsterdam, 1974.

³²Doucet, H., Baumgarten, M. and Infant-Rivard, C., Risk of low birth weight and prematurity among foreign born mothers, *Canadian Journal of Public Health*, 83(3), 1992, pp. 181-3; and Vangen, S., Stottenburg, C., Skjerven, R., Magnus, P., Harris, S. R. and Stay-Pedersen, B., The heavier the better? Birth weight and perinatal mortality indifferent ethnic groups, *International Journal of Epidemiology*, 31 (3), 2002, pp. 654-660.

³³Dobbing, J., Nutritional growth restriction and the nervous system, in Davison, A. N. and Thompson, R. H. S., eds., *The molecular bases of neuropathology*, Edward Arnold, London, 1981, pp 221-233.

³⁴O'Donnel, K. J., Rakeman, M. A., Zhi-Hong, D., Xue-Yi, C., Mei, Z. Y., DeLo, N., Brenner, G., Tai, M., Dong, W. and DeLong, G. R., Effects of iodine supplementation during pregnancy on child growth and development at school age, *Developmental Medicine and Child Neurology*, 44 (2), 2002, pp. 76-81.

³⁵ Tanner, J. M., *Foetus into man: Physical growth from conception to maturity*. Open Books Publishing Ltd., London, 1978.

³⁶Winick, M., Nutrition and cell growth, *Nutrition Review*, 26 (7), 1968, pp. 1954-7.

³⁷Eidelman, A. I., The Relationship of Maternal Nutrition to Fetal Growth and Outcome, in Lebenthal, E. and Shapira, N. eds., *Nutrition in the Female Life Cycle*, Israeli Danone Institute, 2000.

³⁸Falkner, F., Ultrasonography and foetal growth: key perinatal factors. *Journal of Perinatology*, 15 (2), 1995, pp. 114-8. and Tanner J. M., op. cit.

the other hand, peak growth velocity for weight of the foetus occurs in the 32nd to 34th week of pregnancy.³⁹ This is important for two reasons. It implies two different vulnerable periods, and therefore possibly two different mechanisms of interference in linear and weight growth. It also suggests the need for different interventions to protect those growth spurts. It is of great importance to realize that similarly, in postnatal life, the processes leading to stunting and wasting are independent of each other and the commonly-held concept that stunting is the outcome of chronic under nutrition in childhood must be challenged.⁴⁰

This intergenerational cycle is accentuated by high rates of teenage pregnancy, as adolescent girls are even more likely to have low birth weight babies. The way of breaking the cycle is to improve the distribution of birth weights so that mean birth weight is increased.⁴¹

The implication is that nutritional materials needed for the rapid cell division seen in linear growth (i.e. protein and micronutrients) are different from those needed for increases in cell size and weight gain (i.e. calories). It also implies that the nutritional inputs necessary to protect the linear growth spurt must be delivered in or before the 1st trimester and thereafter, while the calories for weight gain are most crucial through mid-pregnancy and the last trimester – assuming that hyperplasia has occurred appropriately in the first trimester. While different nutrients and different mechanisms may be in play, the two are still related since a decrease in absolute cell number (resulting from phase 1 disturbance) will leave fewer cells to grow in phase 3.

There is circumstantial evidence to support this hypothesis:

- (i) Balanced protein energy supplements given to chronically undernourished women during pregnancy (usually in the last half of pregnancy) lead to only modest improvements of birth weight.⁴²
- (ii) The greatest deficits in birth weight due to acute starvation are found when mothers are malnourished in the preconception period.⁴³
- (iii) Intrauterine deficits of non-caloric micronutrients, including zinc, folic acid and vitamin C, correlate with birth weight decrease particularly when absent in the first trimester.⁴⁴
- (iv) Iron supplementation in the first weeks of pregnancy of iron replete, non-anaemic women led to significantly improved birth weight and a lower incidence of low birth weight.⁴⁵

³⁹Eidelman, A. I., *op. cit.*

⁴⁰Shrimpton, R., Victora, C. G., de Onis, M., Lima, R. C., Blossner, M. and Glugston, G., Worldwide timing of growth faltering: implications for nutritional interventions, *Pediatrics*, 107, May 2001.

⁴¹SCN. 6th report on the world nutrition situation: Chapter 3 – Maternal nutrition and the intergenerational cycle of growth failure. United Nations System, Standing Committee on Nutrition, Geneva. 2010

⁴²Kramer, M. S., High protein supplementation in pregnancy (Cochrane Review). *Cochrane Library*, Issue 3, Oxford, 2000.

⁴³Antonov, A. N., Children born during the siege of Leningrad in 1942, *Journal of Pediatrics*, 30, 1947, p. 250.

⁴⁴Scholl, T. O., Hediger, M. L., Schall, J. I., Fischer, R. L. and Khoo, C. S., Low zinc intake during pregnancy: its association with pre-term and very pre-term delivery, *American Journal of Epidemiology*, 137, 1993, pp. 115-24; Scholl, T. O., Hediger, M. L., Schall, J. I., Khoo, C. S. and Fischer, R. L., Dietary and serum folate: their influence on the outcome of pregnancy, *American Journal of Clinical Nutrition*, 63, 1996, pp. 520-5; and Matthews, F., Yuden, P. and Neil, A., Influence of maternal nutrition on outcome of pregnancy: prospective cohort study, *British Medical Journal*, 319, 1999, pp. 339-43.

⁴⁵Gogswell, M. E., Parvanta, I., Ickes, L., Yip, R. and Brittenham, G. M., Iron supplementation during pregnancy, anemia and birth weight: a randomized control trial, *American Journal of Clinical Nutrition*, 78, 2003, pp. 773-81.

Summary of Life Cycle Nutrition

To summarise, intrauterine life effectively establishes the potential for ultimate growth and development of the child, which, as in mental development in the presence of iodine deficiency or adult diseases programmed in utero, may not be measurable at birth, but may only become evident in some cases many years after birth. Attention to maternal health and nutrition before and throughout pregnancy is therefore of paramount importance to establish such potential. Thereafter, postnatal interventions aimed at the child: food, care and health – all the elements of the Nutrition Conceptual Framework – are necessary to ensure that the potential is achieved. Preventing growth failure in utero and preventing growth failure in the first two years of life are equally important for adult body size and composition.⁴⁶

⁴⁶ Li, H., Stein, A. D., Barnhart, H. X., Ramakrishnan, U. and Martorell, R., Associations between prenatal and postnatal growth and adult body size and composition, *American Journal of Clinical Nutrition*, 77, 2003, pp. 1498-1505.

Chapter 4

Recent Developments and Evidence Bases: Global Context

4.1. The Lancet Series on Maternal and Child Under-nutrition

The importance of nutrition interventions in reducing child and maternal mortality and morbidity in developing countries and hence contributing to achieving the Millennium Development Goals (MDGs 4 and 5) was highlighted in the 2008 Lancet Series on Maternal and Child Under nutrition⁴⁷. The *Lancet* Series reviewed the efficacy of interventions that reduced morbidity and mortality resulting from under nutrition. The following interventions pertaining to maternal under nutrition were recommended for implementation in all high-need countries and additional interventions were identified as having sufficient evidence to be implemented in specific situational contexts. A strong case for addressing nutrition – mortality, productivity, national development was made with the list of effective and feasible nutrition evidence, based on global evidence which were as follows:

Interventions with sufficient evidence to implement in all countries:

- Iron and folate supplementation
- Maternal supplements of multiple micronutrients
- Maternal iodine through iodisation of salt
- Maternal calcium supplementation
- Interventions to reduce tobacco consumption or indoor air pollution

Intervention with sufficient evidence to implement in specific situational contexts:

- Maternal supplements of balanced energy and protein
- Maternal iodine supplements
- Maternal deworming in pregnancy
- Intermittent preventative treatment of malaria
- Insecticide treated bed-nets

A major message of the LNS was that, while nutrition is complex and multi-faceted, significant and important reductions can be made relatively quickly through interventions that are cost-effective and feasible to implement in low-resource countries. In addition to identifying ‘essential interventions, the series identified seven challenges to addressing undernutrition, including the importance of ‘doing the right things’, ‘not doing the wrong things’, acting at scale and reaching those in need. Cross-cutting all of these were a core message that “pregnancy to age 24 months is the critical window of opportunity for the delivery of nutrition interventions”⁴⁸.

⁴⁷Black R. E., L. H. Allen, Z. A. Bhutta *et al.* 2008. Maternal and child under nutrition: global and regional exposures and health consequences. *Lancet*. 371: 243-260.

⁴⁸ Bryce *et al.* Maternal and child undernutrition: effective action at national level. *Lancet* 2008

4.2. SUN Initiative

After Lancet series identified the gap both in the interventions as well as in the funding, there was a need for widespread agreement on a broad framework for action to counter this neglect and a growing partnership for collective action among key stakeholders—UN, multi-lateral and bi-lateral development agencies, foundations, developing countries, NGOs and other civil society organizations, researchers, and the private sector. In this context, the Scale Up Nutrition Movement (SUN) was initiated in September 2010 by the UN General Assembly.

It focuses mainly on sharp scaling up of evidence based cost effective interventions to prevent and treat undernutrition through multi-sectoral approach involving related sectors; health and non-health and ensuring sustained domestic and external assistance for nutrition programme. The SUN Movement focuses on “the 1000 day window of opportunity” between the start of pregnancy and the child’s second birthday. As of April 2012, twenty seven countries including Nepal have committed for this movement. The UN Secretary General also appointed a high level, multi-stakeholder Lead Group to provide overall strategic leadership of the SUN Movement. The Prime Minister of Nepal is one of the members of this high level group that has appointed the Director General, DoHS as the national focal point.

4.3. REACH Initiative

Ending Child Hunger and Undernutrition Partnership was jointly established by the United Nations Food and Agriculture Organization (FAO), World Health Organization (WHO), United Nations Children’s Fund (UNICEF) and the World Food Programme (WFP). Renewed Efforts against Child Hunger and Undernutrition (REACH) is a global partnership committed to meeting the nutrition needs of the world’s most vulnerable children and women, through evidenced based analysis and innovative programming that builds government institutional capacity, strengthens policy planning skills and prioritizes scarce resources. Its goal is to support governments in achieving MDG 1.

Nepal is one of the participating partners in this initiative. The REACH initiative also focuses on scaling-up (SUN) actions and REACH Nepal Work Plan (2012-2014) has proposed to achieve following outcomes:

- Increased awareness of the problem and of potential solutions
- Strengthened national policies and programs
- Increased capacity at all levels for action
- Increased efficiency and accountability

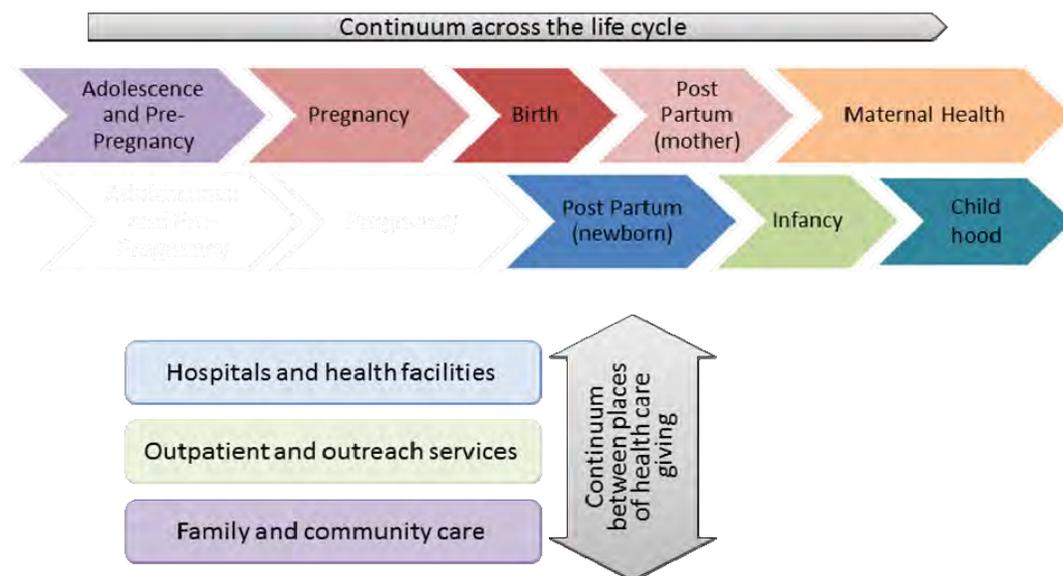
4.4. Continuum of Care

As the problem of under nutrition cuts across the life stages, it is imperative to utilize a model that links the varying but critically related stages of life, the impact and interaction of nutritional status and knowledge between them. There is a strong support and discussion for developing a nutrition strategy that is life cycle and continuum of care based. Strong calls have been made to

integrate programmes for maternal, newborn, and child health recognising that women and children form a unit and that factors affecting one stage of life cycle, impacts on the other. However, there is little know how about how newborn, infant, child, adolescent and maternal nutrition could be linked under one paradigm while addressing both the dimensions of continuum of care: one across the different stages of life and the other across the continuum of health care giving, from home to health facility with a balance between the home, outreach, and facility based services. It would be important to ensure that no essential interventions are omitted, no stages of life neglected, and that the interventions are implemented across all levels of service delivery.

Implementing the continuum of care is also expected to reduce redundancies and overlaps in training, recording and reporting and improve harmonisation between programmes through reinforcement of messages and increased coordination.

Two dimensions of continuum of care



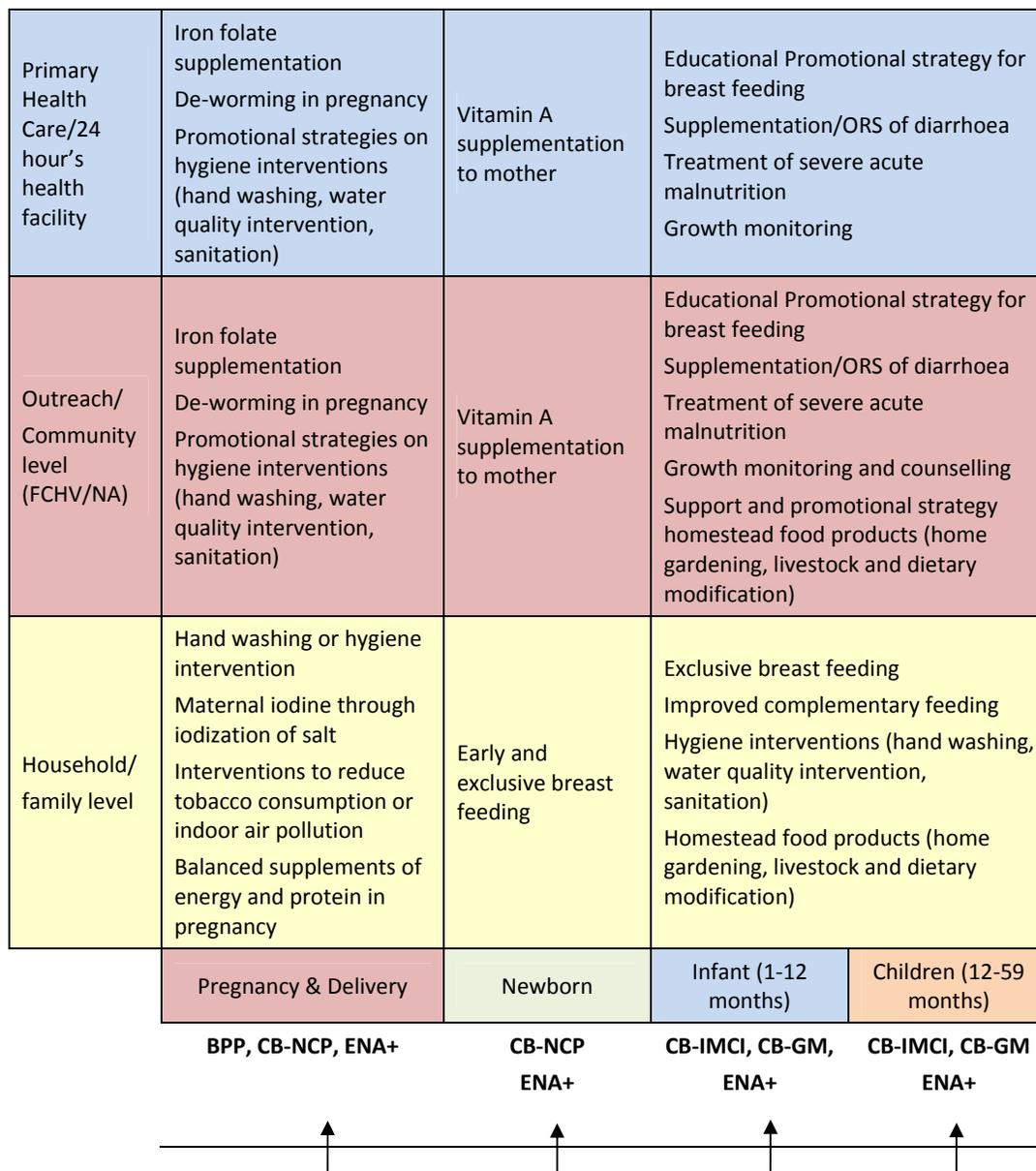
Reference: Kerber et al. Continuum of care for maternal, newborn and child health: from slogan to service delivery. Lancet 2007

4.5. Essential Nutrition Action/Integrated Nutrition Programme

Essential Nutrition Action (ENA) is an integration of all nutrition interventions conceptually and programmatically based on proven impact and is action oriented. ENA is a set of affordable and highly effective nutrition interventions delivered at health facilities and in communities to improve the growth and micronutrient status of children. Based on the fact that many babies are born malnourished due to poor maternal nutrition before and during pregnancy, it has covered all the major action areas: breastfeeding, complementary feeding, feeding of sick child, women's nutrition, vitamin A supplementation, Iron and Folic Acid supplementation and Iodine Deficiency Disorders Control. It has got three key programme components at three levels i.e. health facility level, community level and behaviour change. The ENA intervention harmonises with both

health and non-health sector. The ENA Nutrition Actions has given a clear framework for specific actions to improve nutrition and has greatly expanded nutrition contact far beyond the traditional growth monitoring and promotion programme.

Integrated Continuum of Care Approach: An Example



In Nepal, an integrated nutrition project called SUA AHARA has recently been launched with the support of USAID. Suaahara (good nutrition) is a five-year programme which uses a comprehensive, household-based approach to improve access to, and consumption of nutritious foods. Suaahara will support the GoN in addressing under-nutrition and related health issues for women and children under two years of age in 25 targeted districts in Nepal with poor nutrition indicators. Its main objective is to improve the nutritional status of pregnant and lactating women and children under two years of age by directly addressing the vulnerable points of

development that result in stunting. The program will focus on improving nutrition; maternal, newborn, and child health (MNCH) services; family planning services; water, sanitation and hygiene; and home-based gardening.

4.6. Vitamin A Supplementation

There is recommendation from WHO on post-partum vitamin A supplementation⁴⁹. These indicate that post-partum vitamin A supplementation is not recommended as an intervention to prevent maternal and infant mortality and morbidity (“strong recommendation”). The document notes “the quality of the available evidence for maternal mortality, maternal morbidity and adverse effects was graded as low or very low. The quality of evidence for all-cause infant mortality was high and for cause-specific infant mortality and morbidity was very low. Postpartum women should continue to receive adequate nutrition, which is best achieved through consumption of a balanced healthy diet.”

Low dose treatment of night blind women during pregnancy was recommended by WHO in 1998 in areas where vitamin A deficiency was endemic among children and maternal diets are low in vitamin A⁵⁰. The recommendations were reconfirmed in 2001, along with the other recommendations on vitamin A. Meanwhile in 2002, a Cochrane review was undertaken of vitamin A supplementation during pregnancy. It reported that a Nepal study had found a reduction on all-cause mortality and a reduction in night blindness but not elimination. Another study in Indonesia had a positive effect on anaemia. Two other trials from Malawi did not corroborate these positive findings. The review therefore concluded that “although two trials from Nepal and Indonesia suggested beneficial effects of vitamin A supplementation, further trials are needed to determine whether vitamin A supplementation can reduce maternal mortality and morbidity and by what mechanism.”⁵¹ On the basis of the Cochrane review, supplementation of pregnant women was listed as an intervention with “insufficient or variable evidence of effectiveness” in the Lancet Nutrition Series. In addition, a just published study from Bangladesh concludes that weekly vitamin A supplementation in pregnant women did not reduce all causes of maternal, fetal or infant mortality although it did increase plasma retinol and reduced, but did not eliminate night blindness.⁵² Updated recommendations by WHO for this age group⁵³ also indicate that “vitamin A supplementation in pregnancy as part of routine antenatal care is NOT recommended for the prevention of maternal and infant morbidity and mortality (strong recommendation). However, in areas where vitamin A deficiency is a severe public health problem⁵⁴, vitamin A supplementation in pregnancy is recommended for the

⁴⁹ http://www.who.int/elena/titles/vitamina_postpartum/en/index.html

⁵⁰ WHO and MI. Safe vitamin A dosage during pregnancy and lactation; recommendations and report of a consultation. 1998

⁵¹ Van den Broek et al. Vitamin A supplementation during pregnancy Cochrane Database of Systematic Reviews 2002; 4. CD001996. DOI: 10.1002/14651858.CD001996

⁵² West et al. Effects of Vitamin A or Beta Carotene Supplementation on Pregnancy-Related Mortality and Infant Mortality in Rural Bangladesh: a Cluster Randomized Trial. JAMA 2011

⁵³ http://www.who.int/elena/titles/vitamina_pregnancy/en/index.html

⁵⁴ Vitamin A deficiency is considered a severe public health problem when serum or plasma retinol in pre-school age children is <0.70µmol/l in ≥20%. There is no cut-off available based on night blindness in pregnant women although a prevalence ≥5% is considered moderate. DHS 2006 indicates that in Nepal 5.2% of women with children below 5 were nightblind.

prevention of night blindness (strong recommendation). The quality of the available evidence for maternal mortality was found to be high, whereas for all other critical outcomes it was moderate.”

4.7. Iron and Folic Acid Supplementation

Iron deficiency, leading to anaemia, is the most prevalent of all the micronutrient deficiencies that affects women of reproductive age, especially those who are pregnant and lactating. In pregnant women, anaemia is associated with premature births, intrauterine growth retardation and low birth weight infants. Full-term infants of anaemic mothers have reduced iron-stores and are at risk of becoming iron deficient and anaemic even if exclusively breastfed for six months. Iron deficiency anaemia affects both infants’ and children’s physical and mental development causing learning deficits, eating disorders and poor growth. Anaemic children of all ages are apathetic, which affects social development and educability⁵⁵.

Anaemia reduces the woman’s ability to survive bleeding during and after childbirth and so contributes to maternal mortality. Women with severe anaemia have a 2.5 times greater chance of dying during pregnancy or at delivery than women who do not have anaemia. Anaemia-related fatigue also makes the effort of child labour more difficult, thus prolonging delivery. Conservative estimates suggest anaemia is the direct cause of 3 to 7 percent of maternal deaths worldwide. Other estimates suggest it is the direct or indirect cause of 20 to 40 percent of maternal deaths. Anaemia related fatigue affects work productivity and earned income accordingly. A literature review from 1973 to 1981 found a 10 percent increase in haemoglobin levels associated with a 10 to 20 percent increase in work output. Adults with anaemia are less likely to engage in social activities and less likely to nurture and care for their infants and children.⁵⁶

IFA supplementation of pregnant and lactating women has been a long-standing recommendation of WHO. Guidelines dated 1998 recommend that where the prevalence of anaemia in pregnancy equals or is greater than 40 percent, all women should receive supplements for 6 months during pregnancy and three months post-partum. If prevalence of anaemia is less than 40 percent, supplementation is only needed for 6 months during pregnancy.⁵⁷ In 2011, anaemia prevalence in pregnant women in Nepal was 48 percent.

The Lancet included IFA supplementation of pregnant women in its list of core interventions on the basis of a pooled analysis of data from eight studies that suggested an increase of 12g/dl in haemoglobin at term and a 73 percent reduction in the risk of anaemia at term. They further estimated that this reduction in anaemia would reduce the risk of maternal death by 23

⁵⁵ PAHO, USAID, World Bank publication, “Anaemia Prevention and Control: What Works” (in print). Strategy to Reduce Maternal and Child Under nutrition 7

⁵⁶ Ibid

⁵⁷ Stoltzfus R and Dreyfuss M. Guidelines for the use of iron supplements to prevent and treat iron deficiency anaemia. INACG, WHO and UNICEF. 1998

percent.⁵⁸ Data, including from a study in Nepal, is also accumulating that iron supplementation during pregnancy could reduce low birth weight and may do so without improving anaemia status in the mother^{59,60,61}.

4.8. Deworming for Pregnant Women

Deworming for pregnant women was included in the Lancet list of 'optional' interventions, for implementation in areas with high helminth infestation. Deworming in pregnancy was included because of anticipated improvements in haemoglobin status between the first and third trimester⁶². However, since the Lancet series, a Cochrane review has been published which concludes there is insufficient evidence to recommend use of antihelminthics for pregnant women.⁶³ Interestingly neither the Lancet analysis nor the 2009 Cochrane review appear to have considered the results of Christian et al. in Nepal in which "women given albendazole in the second trimester of pregnancy had a lower rate of severe anaemia during the third trimester. Birth weight of infants of women who had received two doses of albendazole rose by 48g (95% CI 91-98), and infant mortality at 6 months fell by 41% (RR 0.59, 95% CI 0.43-0.82).⁶⁴ WHO and UNICEF both recommend deworming for pregnant women, a WHO meeting in 2002 concluded that "pregnant and lactating women should be considered a high risk group and included in treatment campaigns, as should women of childbearing age.⁶⁵ This conclusion essentially repeated the conclusions of a consultation in 1994 which also recommended deworming of pregnant women, but not in the first trimester.⁶⁶ This recommendation was again repeated in a joint WHO and UNICEF statement issued in 2004.⁶⁷ A review of data on deworming on pregnancy concluded the health benefits of treating pregnant women outweigh any risks to mother, unborn infant or breastfed infant⁶⁸ and a trial in Sri Lanka concluded that mebendazole during pregnancy improved some birth outcomes and was not associated with a significant increase in major congenital defects.⁶⁹

⁵⁸ Bhutta et al. What works? Interventions for maternal and child under nutrition and survival. Lancet 2008

⁵⁹ Cogswell et al. Iron supplementation during pregnancy, anaemia and birth weight: a randomized controlled trial. Am J Clin Nutr 2003; 78: 773-81

⁶⁰ Christian et al. Effects of alternative maternal micronutrient supplements on low birth weight in rural Nepal: double blind randomized community trial. BMJ 2003; 326: 571-4

⁶¹ Mishra et al. Effect of iron supplementation during pregnancy on Birthweight: Evidence from Zimbabwe. FNB 2005; 26 (4) 338-347

⁶² Torelese H et al. Antihelminthic treatment and haemoglobin concentrations during pregnancy. Lancet 2000

⁶³ Haider et al. Effect of administration of antihelminthics for soil transmitted helminthes during pregnancy. Cochrane Database of Systematic Reviews 2009, Issue 2. Art No. CD005547. DOI:10.1002/14651858. CD005547.pub2.

⁶⁴ Christian et al. Antenatal antihelminthic treatment, birth weight, and infant survival in rural Nepal. Lancet 2004; 364: 981-983.

⁶⁵ WHO. Informal Consultation on the Use of Praziquantel during Pregnancy/Lactation and Albendazole/Mebendazole in Children under 24 Months. 8-9 April 2002, Geneva.

⁶⁶ WHO Informal Consultation on hookworm infection and anaemia in girls and women, Geneva 1994.

⁶⁷ WHO and UNICEF. Prevention and control of schistosomiasis and soil-transmitted helminthiasis: Joint Statement by WHO and UNICEF 2004

⁶⁸ Savioli et al. Use of antihelminthic drugs during pregnancy. American Journal of Obstetric Gynecology, 2003

⁶⁹ De Silva et al. Effect of mebendazole therapy during pregnancy and birth outcomes. Lancet 1999

4.9. Maternal Supplementation with Multiple Micro-nutrients

Multiple micronutrient supplementations (MNS) during pregnancy are listed by the LNS as one of the maternal and birth outcome interventions for which there is sufficient evidence for implementation. A systematic review of nine randomized controlled trials found that multiple-micronutrient supplementation resulted in a statistically significant decrease in the number of low birth weight babies, small-for-gestational-age babies and in maternal anaemia. However, these differences lost statistical significance when MNS was compared with iron folic acid supplementation alone. No statistically significant differences were shown for the outcomes of preterm births and perinatal mortality in any of the comparisons.⁷⁰ A later meta-analysis indicated a significant reduction in birth weight compared to iron folic acid supplementation and birth weight was significantly higher (weighted difference 54 gram). There were no significant differences in the risk of preterm birth or small-for-gestational-age infants.⁷¹ A further meta-analysis found the following in comparison to iron folate supplementation (i) similar improvements in haemoglobin levels, although MNSs often have lower doses of iron, (ii) small but significant increase in birth weight (pooled estimate +22.4g, with a range of +4.8-75.5g); similar to that achieved with a food supplement) and (iii) improved attainment of child height (i.e. reduced stunting) in some trials. The most recent meta-analysis also concludes “MNS was more effective than IFA at reducing the risk of low birth weight and small size for gestational age. A number of studies have also suggested longer term benefits such as reduced stunting at 2 years in Viet Nam and slightly higher weight at 2.5 years in Nepal. In 2006, a WHO, UNICEF and WFP joint statement on the use of multiple micronutrients in emergencies was issued as a result of the strong evidence that MNS were at least as good at reducing anaemia as IFA supplements and had greater impacts upon birth weight.

However, in 2005, Christian et al. pooled the results of the trials in Dhanusha and Sarlahi and reported a non-significant increase in perinatal mortality associated with MNS. A trial in Pakistan also noted non-significantly higher early neonatal mortality in the MNS group and in China, although there were non-significant differences for perinatal mortality, iron folic acid was associated with a significantly reduced early neonatal mortality by 54 percent. The authors concluded that higher levels of iron were needed to maximize reductions in neonatal mortality. These suggestions of increased neonatal mortality have raised concerns and to date, WHO has not issued any recommendations on use of MNS in pregnancy.

A recent meta-analysis by Kawai et al. deliberately set out to consider this question, including potential sources of heterogeneity in the effect of supplementation on perinatal mortality. They conclude “micronutrient supplementation had no overall effect on perinatal mortality although substantial heterogeneity was evident. Subgroup and meta-analyses suggested that micronutrient supplementation was associated with a lower risk of perinatal mortality in trials in which more than 50 percent of mothers had formal education or in which supplementation was

⁷⁰ Haider&Bhutta. Multiple-micronutrient supplementation for women during pregnancy. Cochrane Database Syst Rev 2006

⁷¹ Shah et al. Effect of prenatal multi micronutrient supplementation on pregnancy outcomes: a meta-analysis. CMAJ 2009

initiated after a mean of 20 weeks gestation.” Overall it appears that further evidence on the safety and impacts of MNS is still needed.

4.10. Maternal Calcium Supplementation

Maternal calcium supplementation was included in the core list of interventions for improving maternal and newborn outcomes by the LNS because a meta-analysis has shown that it reduced the risk of pre-eclampsia. The meta-analysis found that calcium supplementation during pregnancy was a safe and relatively cheap way of reducing the risk of pre-eclampsia in women at increased risk and women from communities with low dietary calcium. Pre-eclampsia is a leading cause of newborn and maternal mortality and preterm birth. More evidence on the optimal dose is still needed however.⁷²

4.11. Maternal Food Supplementation

The LNS analysis concluded that balanced energy and protein food supplements might reduce the risk of a small for gestational age baby by 32%. Supplements also modestly increased maternal weight gain during pregnancy. These are worthy outcomes and it would seem worthwhile to consider food supplements for pregnant women in Nepal, especially in sub-regions where maternal malnutrition, low birth weight and stunting are high.

4.12. Adolescent Iron and Folate Supplementation

Another potential intervention to improve maternal nutrition is weekly iron folate supplementation of adolescent girls. Although not specifically recommended by the LNS, a WHO recommendation exists for weekly iron folate supplementation (WIFS) in women of reproductive age in populations where the prevalence of anaemia is above 20% and food fortification programmes are not in place. Nepal meets these criteria. A variety of evidence, including several programmatic interventions in East Asia, suggest that WIFS is effective at reducing anaemia with a dose response such that the longer a woman consumes the supplement pre-pregnancy, the less likely she is to be anaemic during the first and second trimesters of pregnancy. WIFS were not effective at eliminating anaemia in the third trimester but anaemia levels were lower than in a control group consuming daily IFA.⁷³

Summary of Evidences

- Vitamin A supplementation to women does not impact maternal or neonatal outcomes
- Strong evidence for calcium supplementation to reduce the risk of high blood pressure and pre-eclampsia. Calcium however interacts with Fe and folic acid; operationally it should therefore be separated from routine Fe and FA supplementation.
- Zinc supplementation during pregnancy is not recommended as no impact

⁷²Hofmeyr et al. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. Cochrane Database Syst Rev. 2006; 3: CD001059

⁷³WHO. Weekly iron-folic acid supplementation (WIFS) in women of reproductive age: its role in promoting optimal maternal and child health. Position statement. Geneva, World Health Organization, 2009 (http://www.who.int/nutrition/publications/micronutrients/weekly_iron_folicacid.pdf)

- Multiple micronutrient supplementation for pregnant women does not have greater impact than Fe and FA on maternal or neonatal outcomes, and should not be replaced
- Maternal energy and protein supplements during pregnancy have a positive impact on maternal and neonatal outcomes, modest increase in birth weight and substantial increase in gestational weight gain
- With the exception of iodised salt, evidence for the benefits of fortification strategies on micronutrient status of young children and women is weak.
- Weekly iron and folic acid supplementation of adolescent girls reduces anaemia.

Chapter 5

Existing Interventions to Address Maternal Under-nutrition in Nepal

Internationally, GoN is a party to various declarations and instruments such as Convention on Rights of Child (CRC), Convention on the Elimination of Discrimination against Women (CEDAW), Millennium Development Goals (MDGs), Scaling up Nutrition (SUN) initiative and International Covenant on Economic Social and Cultural Rights (ICESCR). At the regional level, Nepal is party to SAARC Development Goals and South-East Asia Regional Nutrition Strategy. All of these declarations and conventions require the government to ensure survival and development needs of women and children to which GoN is fully committed and accountable for. Government is committed towards achieving MDGs with strong nutrition components.

The National Nutrition Programme under Department of Health Services (DoHS) has laid the vision as “all Nepali people living with adequate nutrition, food safety and food security for adequate physical, mental and social growth and development and survival” with the mission to improve the overall nutritional status of children, women of child bearing age, pregnant women, and all ages through the control of general malnutrition and the prevention and control of micronutrient deficiency disorders having a broader inter and intra-sectoral collaboration and coordination, partnership among different stakeholders and high level of awareness and cooperation of population in general.

Government has the following targets related to maternal nutrition to be achieved by the end of 2015:

- Reduce anaemia in pregnant women to 43%
- Reduce anaemia in all age women to 42%
- Reduce prevalence of night blindness in pregnant women to 1%
- Reduce prevalence of thinness (BMI<18.5) in women to 15%

Following are the objectives related to maternal nutrition;

- To reduce under nutrition in reproductive aged women to half of the 2000 level by the year 2017
- To reduce the prevalence of anaemia to less than 40% by 2017 among women
- To virtually eliminate IDD and sustain the elimination by 2017
- To virtually eliminate vitamin A deficiency and sustain the elimination by 2017
- To reduce the infestation of intestinal worms among pregnant women to less than 10% by 2017

Government of Nepal in collaboration and coordination with I/NGOs has implemented the following nutrition programs to address the maternal under nutrition.^{74,75}

⁷⁴Ministry of Health and Population, Nepal. Annual Report (2009/2010). Department of Health Services; 2010

5.1. Control of Protein Energy Malnutrition (PEM)

Protein energy malnutrition (PEM) is one of the main problems affecting children in Nepal. One of the important causes of PEM in Nepal is low birth weight (LBW) which is a sign of poor maternal nutrition leading to an intergenerational cycle of malnutrition. To address the problem of maternal under-nutrition, following are the strategies set by GoN;

- Create awareness of the importance of additional dietary intake during pregnancy and lactation
- Strengthen the activities of nutrition education and counselling to improve iron status of pregnant and lactating women
- Reduce heavy work load of pregnant and lactating women
- Prevent early pregnancy and ensure adequate birth spacing
- Promote social (community and family) support for maintaining good health care and dietary habit

5.2. Control of Iron Deficiency Anaemia

Anaemia caused by iron deficiency is a major public health problem for pregnant women in Nepal. Iron and folic acid (IFA) supplementation for pregnant and lactating women as part of antenatal care and post natal care (PNC) has been a policy of the MOHP since 1998. The prevalence of anaemia among pregnant women according to NFHS 1996 was 75 percent while NDHS 2011 found the prevalence reduced to 48 percent. In order to further increase the coverage and compliance of iron tablets among pregnant and postnatal mothers 'Intensification of Maternal and Neonatal Micronutrient Program (IMNMP) is being implemented since 2003 through the existing health facilities and FCHVs.

Programme aimed at increasing coverage and compliance of iron and folic acid supplementation for pregnant women through awareness raising activities, advocacy, information through public media, and training of health workers/volunteers at all levels. It has also focused on reducing the burden of parasitic infestation, promoting dietary diversity, promoting maternal care practices and services to improve nutrition status of mothers, modalities to address iron deficiency in adolescents and non-pregnant women of reproductive age. The strategies adopted by GoN are as follows:

- Create awareness of anaemia and importance of iron supplementation
- Ensure availability of iron/folate supplements at all health facilities and outreach clinics (ORC)
- Increase accessibility of iron/folate at the family and community level
- Create awareness about improving living conditions including sanitation and hygiene
- Increase awareness about iron rich foods, of both animal and vegetables sources

⁷⁵Ministry of Health and Population Nepal. National Nutrition Policy and Strategy. Department of Health Service, Child Health Division, Nutrition Section; 2008

- Advocate for equity among genders in access and control over household food
- Create awareness about the importance of increased food intake and reduced work load during pregnancy
- Promote advocacy campaigns against teenage pregnancy, early marriage and short birth spacing
- Develop a scheme for screening and diagnosing of high risk women for severe anaemia

5.3. Control of Vitamin A Deficiency

Nepal has the experience in implementing a number of vitamin A supplementation interventions. The main intervention has been Vitamin A supplementation for all children 6-59 months, together with de-worming of children 12-59 months, along with the inclusion of vitamin A supplementation in treatment for measles, xerophthalmia, persistent diarrhoea and severe malnutrition. Vitamin A supplementation of post-partum women was introduced at scale. Additionally, treatment of night blindness in pregnant women with weekly low dose supplementation, and vitamin A supplementation of neonates was also piloted. The pilot of night blindness has been completed and is no longer running. The pilot of neonatal vitamin A supplementation (VAS) has also ended and is undergoing final evaluation.

The MoHP policy regarding maternal Vitamin A supplementation is to provide high dose Vitamin A (200,000 IU) capsule within with first 45 days after delivery⁷⁶ through health workers during post natal check-ups. The programme has been operating since 1995.

- Promote vitamin A deficiency control program for pregnant and postpartum mothers
- Ensure availability of VA capsules at health facilities
- Increase awareness of importance of VA capsules supplementation
- Increase awareness of benefits of VA capsules supplementation
- Promote VA capsules supplementation within 6 weeks of delivery
- Advocate for increased home production, consumption and preservation of Vitamin A rich foods
- Strengthen implementation of fortification activity
- Promote the consumption of Vitamin A rich food and balanced diet through nutrition education

5.4. De-worming

As infections with intestinal parasites is one of the factors contributing to anaemia among pregnant women, de-worming during second trimester of pregnancy with single dose of Albendazole tablet is being routinely distributed through all health facilities as per the National Nutrition Policy and Strategy 2004. The major strategies include:

- Advocate for people to improve their hygiene practices.
- Strengthen de-worming program for pregnant women through health facilities

⁷⁶Ministry of Health Population (MOHP) [Nepal]. 2004. National Nutrition Policy and Strategy. Kathmandu, Nepal: Nutrition Section, Child Health Division, Ministry of Health and Population.

In addition, biannual school deworming has also been launched under School Health and Nutrition (SHN) Program for the primary students at government schools throughout the country.

5.5. Control of Iodine Deficiency Disorders

Iodine deficiency disorder (IDD) was an endemic problem in Nepal, especially in the western mountains and mid hills for which Ministry of Health and Population adopted a policy to fortify all edible common salt with iodine. Efforts are underway for raising awareness through social marketing for the use of the Government endorsed “two-child-logo” iodised salt packet. The month of February is used for creating awareness through mass campaign for the use of iodized salt. The program has following strategies;

- Strengthen the implementation of Iodized Salt Act, 2055 for regulation and monitoring of iodized salt trade in order to ensure that all edible salt is iodized
- Increase the accessibility and market share of iodized packet salt with ‘two-child’ logo
- Create awareness about the importance of use of iodized salt for the control of IDD through Social Marketing Campaign
- Explore the possibility of progress evaluation system in IDD control program on a rotational basis in all 5 development regions

5.6. Other Programmes Impacting on Maternal Nutrition

There are programmes currently being implemented from Family Health Division that have components and activities that impact on maternal nutrition. The important ones are the National Safe Motherhood Programme, Birth Preparedness Programme (BPP), Family Planning Programme, Female Community Health Volunteer (FCHV) Programme, and the Primary Health Care Outreach Programme. To cite an example, the birth preparedness package is considered below:

The following are the important interventions for care of mother during pregnancy that is included in the birth preparedness package:

a. Dietary advice

To eat nutrient rich food in adequate amounts (more than what is normally consumed) and increase the frequency of feeding of-

- Food that provides energy: rice, wheat, millets, ghee, oil
- Food that enhances growth and development : lentils, meat, fish, milk, yoghurt and eggs
- Protective foods: green leafy vegetables, yellow fruits and vegetables
- Consumption of food rich in iron
- Consumption of iodised salt with two child logo

b. Health check-up

- Importance of regular ANC
- Supplementation with iron and folic acid along with deworming tablets

- Personal hygiene (to keep hands, nails, the private parts and body) clean, in order to prevent infections.
- Take adequate rest even during the day time
- Avoid lifting of heavy weight
- Avoid alcohol, cigarette, and tobacco consumption as they may increase the risk of abortion, IUGR, and delay development.

c. Essential New-born Care

- Initial breast feeding within an hour of birth.
- Feed colostrum to the baby to improve the ability of fight infections.

d. Post-Partum Period

- To eat an adequate amount of nutrient rich food, in order to improve the growth and development and to enhance the ability of the baby to fight infections.
- Family planning
 - Counselling on advantages of FP
 - Promotion of the use of contraceptives

These programmes are currently being implemented throughout the country with components that include interventions at home, through outreach programme as well as health facility, as per programme design.

It is important to note that:

- The programmes have not been evaluated.
- Concerns have been raised about the quality of services, however they have not been assessed, and neither have their impact on desired behaviour change measured.
- The programmes are currently being implemented in a vertical manner, leaving room for the desired integration to ensure continuum of care.

5.7. Pilot Studies

5.7.1. Mother and Child Health Care

In order to improve the nutritional status of targeted women and children and raise the awareness and utilization of community-based out-reach services, this programme for supplementary food was implemented in remote food deficit districts of Nepal in Dadelhdhura, Doti, Darchula, Baitadi, Bajhang, Bajura, Achham and Salyan in support of World Food Program (WFP). The final evaluation shows that such programme was relevant area with high level of food insecurity; it has also achieved the expected outcome of improving the utilization of health services by pregnant and lactating mothers, and the expected impact on reducing prevalence of underweight among children also been met.

5.7.2. School Health and Nutrition Programme

School aged children, especially in the government-run schools are also one of the vulnerable groups to suffer from under nutrition. To address this issue, a 'National School Health and Nutrition Strategy' has also been jointly developed and approved by MoHP and Ministry of Education (MoE) in 2006. With the help of JICA technical assistance all components of the school health and nutrition strategy is implemented on pilot basis in 2 districts, Syangja and Sindhupalchowk from June 2008 and will continue up to May 2012. This strategy has been scaled in some other districts in a phase-wise manner with technical and financial assistance of other EDPs and school health and nutrition network with good coordination between relevant sectors (especially Ministry of Health and Population and Ministry of Education).

The main goal of the programme is to develop physical, mental, emotional and educational status of the school children, and the objectives are as follows:

- Improve use of SHN services by school children
- Improve healthy school environment
- Improve health and nutrition behaviours and habits
- Improve and strengthen community support system and policy environment

The end line survey has recently been carried out and it was found that there had been notable positive improvement seen in terms of most of the indicators that were used during the baseline and mid-term survey.

5.7.3. Maternal Nutrition Programme

Mother and Infant Research Activities (MIRA) in collaboration with University College of London and Nepal Government has piloted maternal nutrition program in Makawanpur and Dhanusha districts facilitated through women's group. The study found the positive change in maternal eating behaviour in pregnancy and postpartum and maternal and child anthropometry.

5.7.4. Action against Malnutrition through Agriculture

Action Against Malnutrition through Agriculture (AAMA) project which is an innovation to significantly improve nutritional status by targeting pregnant and lactating women and children less than two years of age by addressing multiple determinant of malnutrition in 90 Village Development Committees (VDCs) of three districts in Far-Western Nepal: Kailali in the southern Terai region, Baitadi in the central Hill region, and Bajura in the northern Mountain region.

AAMA merges two proven programs that address complementary and critical facets of malnutrition in Nepal and throughout the developing world: food security and nutrition knowledge/practices. The first element is HKI's signature Homestead Food Production (HFP) program, which establishes village model farms (VMFs) that provide technical support and inputs to associated beneficiary households to enable them to set up "developed" home gardens and raise poultry. The HFP program has demonstrated positive impact on household food

production, consumption and micronutrient status, as well as on women's economic and social empowerment. The second element is the Essential Nutrition Actions (ENA) framework, which is a set of affordable and highly effective nutrition interventions that have a proven impact on nutrition practices.

The process evaluation report has shown encouraging improvement both in the production and consumption of diverse food among the mother and the children throughout the year.

5.7.5. Maternal Calcium Supplementation

A small acceptability study has been undertaken on calcium supplementation during pregnancy to identify the form of calcium that women prefer. The study, which was carried out in two VDCs in Banke district found that coverage and acceptability was high and that tablets were preferred over sachets of powder. A pilot in one district is now planned, to assess coverage and compliance and to examine whether or not calcium supplementation interferes with IFA supplementation.

Chapter 6

Recent Developments in Nepal

Significant past successes in scaling up essential nutrition interventions in Nepal has resulted in success particularly in micronutrient interventions. Despite improvements however, prevalence of stunting is still high. The other priority is wasting as these children are at increased risk of death apart from its moral and humanitarian importance. Underlying both stunting and wasting is maternal nutrition which roughly accounts for half of the childhood stunting. There has been renewed interest and effort to address the above persistent problems of undernutrition and to accelerate the progress towards the MDGs. Some of the key developments are described below:

6.1. Nutrition Assessment and Gap Analysis

In the recent times, there has been increasing commitment both from the government as well as donors in order to increase the funding for nutrition and improve the architecture for collaboration. The process began with the Nutrition Assessment and Gap Analysis (NAGA) in 2009 to provide a synthesis of information necessary to develop a detailed Multi-sector Plan for Nutrition for the next five years. The NAGA reviewed and made recommendations on evidence-based and feasible interventions for health, agriculture, education and welfare sectors.

6.2. Nepal Health Sector Plan II (NHSP II)

The lack of sufficient progress in improving the nutritional status of women and young children is also highlighted in the NHSP-II, and has led the MoHP to identify nutrition as a high priority area for investment. The NHSP-II establishes the activities that government will undertake to improve nutrition in the country. Within these activities are a range of food utilization and nutrition related services, including child growth monitoring and promotion, micronutrient supplementation, food supplementation and interventions to improve child survival. However, to reduce the prevalence of stunting, it is essential that health sector work closely with other sectors. This was also highlighted as one of the key lessons learned in the recent SWAp document⁷⁷.

6.3. Review of Evidence

A review⁷⁸ was commissioned by the World Bank, on behalf of the Ministry of Health and Population, Government of Nepal and the Nepal Nutrition Group of the external development partners working in Nepal, with the aim to provide suggestions for the government on effective, feasible and essential nutrition interventions in the health sector that would address the priority causes of maternal and child under nutrition in Nepal. It was envisaged that these interventions

⁷⁷ RTI International (May 2010): *The Sector-Wide Approach in the Health Sector, Achievements and Lessons learned*. Research Triangle Park, NC, USA.

⁷⁸ *Accelerating Progress in Reducing Maternal and Child Under nutrition in Nepal: A review of global evidence of essential nutrition interventions for the Nepal Health Sector Plan II and Multi-Sectoral plan for Nutrition*, Report prepared by Karen odling, World Bank Consultant, October 2011

would be implemented within the NHSP II and the Multi-sectoral Plan for Nutrition. The document clearly states that in contrast to micro-nutrient interventions (iron, folic acid and salt iodisation) for pregnant and post-partum women, and deworming, both global and Nepal evidence on what works was lacking for maternal nutrition, hence the review identified more evaluation for the following:

- Interventions to improve maternal nutrition
- Iron supplementation and deworming for adolescent girls
- Calcium supplementation during pregnancy

Technical review for Vitamin A supplementation for post-partum mothers was also recommended in view of the WHO recommendation.

6.4. Multi-sectoral Nutrition Plan

As proposed by NAGA, a multi sectoral nutrition architecture has been created that comprises of a National Nutrition Coordinating Committee (NNCC) under the auspices of the National Planning Commission (NPC). A Multi-sectoral Nutrition Plan (MSNP) for accelerating the reduction of maternal and child under-nutrition in Nepal has been developed and handed over to NPC for its endorsement by the government. Its goal, over the next five years, is to improve maternal and child nutrition, which will result in the reduction of Maternal Infant and Young Child (MIYC) under nutrition, in terms of maternal BMI and child stunting, by one third. The main purpose is to strengthen capacity of the NPC and the key Ministries to promote and steer the multi-sectoral nutrition programme for improved maternal and child nutrition at all the key levels of society. The interventions when implemented by each sector together is expected to improve maternal and child nutrition in the optimal window of opportunity from conception to 24 months of age. It incorporates proven the nutrition specific interventions through the MoHP and the nutrition sensitive interventions through the other sectors.

Nutrition Specific through MoHP

- To address the “immediate causes, aimed at family and community levels
- Programs to improve M&IYC feeding
- Targeted at individual level of causality
 - M&IYC Feeding
 - Prevention and management of infectious illnesses: diarrhea, ARI, malaria, worm infestation etc

Nutrition Sensitive through Other Sectors

In the long term, interventions for the following are necessary and delivered through non health sector

- Availability of food
- Affordability of food
- Quality of food and

- Utilization of food
- Access and use of toilets
- Access to food: MoAC/ MoLD (social protection)
- Access to sanitation: MoPPW
- Behaviour change: MoE
- Coordination between the different sectors: MoLD, NPC

6.5. Formation of Nutrition Technical Committee

In recognition of the need for concerted efforts to address under-nutrition within health sector a Nutrition Technical Committee (NUTEC) has been formed within DoHS/MoHP to provide advisory support and guidance on nutrition to key sectors, facilitate policy and technical dialogue across all relevant sectors, international donors, partners and technical experts, and to monitor performance with respect to nutrition against the goals, objectives, activities/interventions and targets in sector strategies and policies.

A Maternal Nutrition group has been formed under the Nutrition Technical Committee to develop the Health Sector Strategy for Maternal Under-nutrition which is in the process.

Chapter 7

Gaps in Existing Interventions

The gaps in existing interventions to address maternal under nutrition have been explored under a broad umbrella, starting from gaps in policy and strategy; the existing institutional arrangements including capacity; and lastly the programmatic gaps.

7.1. Policy and Strategy

7.1.1. Continuum of Care and Life Cycle Approach

Though there is support and discussion for developing a nutrition strategy that is life cycle and continuum of care (home to health facility and beyond) based. However, there is little mention of it in the policy or strategy documents including the NHSP-II or its results framework. Linking technical interventions under the rubric of life cycle and continuum of care framework for understanding, planning and implementing nutrition interventions within the health sector and beyond to incorporate other sectors is lacking.

7.1.2. Maternal Nutrition

Maternal nutrition is a critical need in Nepal; the government with the support of the partners are concerned about improving maternal nutritional status in the country. Maternal under nutrition and poor weight gain during pregnancy, low birth weight, maternal anaemia, intra-household work and food distribution during pregnancy and after birth, are essential issues that must be addressed. However there is lack of clarity about what interventions are required to adequately address this challenge. The lack of a strategy on maternal nutrition therefore is deeply felt.

7.1.3. Urban Nutrition

The NHSP 2 document and current government programming have little or no focus on nutrition issues that face growing urban populations. Considering the recent trends towards urbanization the lack of an urban nutrition strategy, targets and programming is a major gap.

7.1.4. Gender and Social Inclusion (GESI)

Nutrition interventions will greatly benefit from the system wide focus on integration of GESI strategies into existing and future interventions. By advocating a more community based approach for nutrition, NHSP-II, allows for the opportunity for improving access to nutrition interventions by socially excluded women and families. However, challenges remain in designing strategies to address the needs of such communities in an equitable manner.

7.2. Institutional Arrangements and Capacity

7.2.1. Management of Nutrition Programming

Nutrition Section under Child Health Division manages most of the nutrition programmes, namely, the micro-nutrient supplementation, school nutrition, IYCF and growth monitoring; while maternal nutrition is under the purview of the Family Health Division within the DoHS. Coordination between FHD and CHD therefore is crucial to address the continuum of care for nutrition.

7.2.2. Coordination

There is a need for better coordination within the divisions, centres, and MoHP for nutrition planning and implementation, specifically amongst, FHD, CHD, the National Health Education Information and Communication Centre (NHEICC), the National Health Training Centre (NHTC) and the EDPs within the health sector. With the MSNP ready to be rolled out, the need for stronger coordination mechanism has increased many folds.

7.2.3. Human Resources

Lack of human resources for nutrition is a critical barrier for implementation of existing nutrition interventions. Human resource challenges exist on many fronts, the first barrier is the number of staff allocated to serve the nutrition functions within DoHS at the national, regional and district level; secondly the knowledge and capacity of staff to design, plan, implement, monitor and refine nutrition programming; and thirdly, the capacity of the front-line health workers and volunteers for providing nutrition services and counselling regarding appropriate diet (including locally available foods) and care, needs to be strengthened at all levels.

7.2.4. Nutrition Monitoring and Evaluation

The existing monitoring systems that provide information relevant to nutrition are the Health Management Information System (HMIS), which is complemented by periodic surveys, including the Demographic and Health Surveys (DHS) and Nepal Living Standards Survey (NLSS). HMIS provides information on staffing for each health facility level, and on a wide variety of service related statistics including nutrition indicators. The information on maternal nutrition captured, include: post-partum vitamin A, iron/folate distributed to pregnant women, ANC visits, information on infections and other morbidities, and hospital admissions.

The DHS reports on many nutrition indicators and determinants, secondary analysis of DHS information has potential to clarify the variation in determinants and how this variation affects nutritional status. A further valuable source of information on nutrition and factors affecting it is provided by the NLSS. This provides the analysis and targeting food security and nutrition interventions. These systems provide information in a periodic manner; however, lack of nutrition monitoring and surveillance system that could help in early detection of nutritional problems and their effective management in the country is a constraint.

7.3. Programmatic Gaps Pertaining to Maternal Under-nutrition

- Low coverage and compliance to IFA during pregnancy and particularly during the post-partum period.
- Weak nutrition education and counselling
- Nutrition programming is intermittent and lacks continuum of care, both through life cycle as well as home and health facility.
- Reaching the most vulnerable population groups (groups at risk) of mothers and children
- Urban nutrition- in the light of recent and continuing growth in urban areas
- Status of women and integration of GESI
- Low adequate HH iodine consumption in Hill and Mountain districts (73%) and rural 77.7% - Specially low in the hilly areas in the Mid-West, Far-west and Eastern region
- Nutrition interventions within the health sector are mostly fragmented, targeting individual problems and micronutrient deficiencies
- Lack of linkages between health sector interventions and development programmes beyond the health sector

Chapter 8

Recommendations

8.1. Policy Recommendations

The priority groups for nutrition interventions from MoHP have historically been women of reproductive age and children under five. However, to address the problem of under nutrition in a holistic manner, a comprehensive, sustainable approach that takes into account the needs of the adolescents and incorporates a continuum of care approach both across the life cycle as well as from home to health facility and beyond.

- **Target adolescent girls and pre-pregnant women** to ensure that all women enter pregnancy with optimal health and nutrition in order to ensure optimal foetal growth and development and foetal outcomes. Nutrition interventions for adolescents could be piloted for integration with adolescent friendly sexual and reproductive health services and/or with the school health and nutrition programme. Piloting of weekly iron and folic acid, deworming, education on nutrition, discouragement for early marriage and childbearing and avoidance of smoking could be piggy-backed with the ongoing services.
- **Improve the community based BCC Package** by incorporating maternal dietary intake with adequate macro and micro nutrient rich food, care and care seeking, FP, child spacing, avoidance of teenage pregnancy, reducing smoking and exposure to indoor smoke and personal hygiene. The BCC approach must imbue GESI principles. Linkages with other community-based programs such as the birth preparedness package, which incorporates key behaviour change messages for the pregnant woman, her husband and family and implemented through the FCHVs provides an ideal entry point for the community based nutrition programme that is envisioned in the NHSP-II that aims to promote improved feeding and health practices via community health workers and volunteers..
- **Strengthen coordination between nutrition, safe motherhood and family planning services.** This would take into account access to contraceptive services so that women can plan their pregnancies, delay the age of first birth, lower fertility, improve birth spacing and prevent unwanted pregnancy. There is another reason: evidence exists that as birth weight increases (which is one of the hoped for outcomes of improved maternal nutrition), the relative risk of obstructed labour may also increase,⁷⁹ particularly in populations where women are of short stature (due to under nutrition as children, or because of their young age). The interventions to improve maternal nutrition therefore should go hand in hand with access to emergency obstetric care services. Thus, should there be an obstructed labour due to increased birth size or other reasons; the woman is able to access quality emergency obstetric care services for the required Caesarean section.

⁷⁹Rush, D., Nutrition and Maternal Mortality in the Developing World, *American Journal of Clinical Nutrition*, 72 (supplement), 2000, pp. 212S-40S.

- Strengthen the coordination and synergy between health/nutrition and the multi-sectoral initiatives underway in the country
- Address the growing concern of over-nutrition. There is a need to make cognisance of the problem of overnutrition and be prepared to address “double burden of malnutrition”, the coexistence of under and over nutrition in the country. Unless addressed early and adequately, overnutrition will inevitably lead to increased risk of non-communicable diseases. Infants and children who experience early growth retardation in life grow into young adults with higher risk of overnutrition and associated diseases (such as hypertension, diabetes and cardiovascular diseases). Health and nutrition education on the need of having balanced diet with plenty of vegetables, adopting healthy lifestyles with at least moderated physical activity should be planned in coordination with the other efforts to address non-communicable diseases in the country.

8.2. Programme Recommendations

- The existing programs like coverage and compliance of iron, folic acid and de-worming during pregnancy should be continued as a short term strategy while comprehensive programs need to be developed incorporating existing best practices (eg. breastfeeding) with focus on nutrition and food security.
- Nutrition education to improve dietary intake, diversification of diet, consumption of pulse and vegetable, food that are rich in iron/folate, and food items that promote iron absorption should be promoted.
- Integrated, multi-sectoral programmatic approach for improving maternal weight gain through nutrition education and improved nutritional intake, diversification of diet, consumption of pulse and vegetable, food that are rich in iron/folate, and food items that promote iron absorption should be promoted and if required food supplementation in food deficit areas to improve the birth weight of infants born to undernourished women.
- Promotion of food fortification
- More focus on improving maternal nutrition through nutrition education and if required food supplementation in food deficit areas as an interim strategy to improve the birth weight of infants born to undernourished women.

8.3. Capacity Enhancement

- To enhance the capacity of current and future staff on national, regional and local levels through appropriate training as per their job descriptions. For supervisors and managers, this would be on nutrition program management related aspect planning, monitoring, and supervision. The peripheral staff would need to have improved nutrition education as well as nutrition counselling skills on diet and nutrition needs, micronutrient and energy supplementation. Improving their knowledge in basic nutrition and building their capacity

will help them make better use of locally available foods and address the local food taboos and practices for improved nutrition

8.4. Nutrition Monitoring

- Strengthening of nutrition indicators collected through different sources should be coupled with information on food security in the districts that may contribute to under nutrition. This would help to clarify factors that may differentially affect nutrition among different populations and in different geographic areas. The current DHS and NLSS provide information on nutrition situation and trends at a periodic interval; however, having a nutrition surveillance system could help in continuous assessment of nutritional status and detect changes in order to initiate corrective or remedial actions in a timely manner.

8.5. Programme Coordination within Health Sector

- Better coordination and interaction amongst the various division, departments and centres is vital and thus cannot be over emphasized to improve program effectiveness in terms of human resource development, avoidance of duplication, optimal use of resources and standardization of training, and communication activities.
- The recently formed Nutrition Technical Committee (NUTEC) within the Department of Health Services can facilitate better co-ordination among the various divisions and centres within health sector.
- Develop the implementation plan for the Integrated MNCH Communication Strategy that has been developed with participation of all stakeholders and the leadership of NHEICC.

8.6. Inter-sectoral Collaboration

- The activities outlined in the Multi Sectoral Nutrition Plan (MSNP) need to be implemented in a co-ordinated approach among all relevant sectors (viz: agriculture, education, health, local development and beyond). There is a critical need to ensure that women have access to adequate amount of macro and micro nutrient rich foods, are equipped with knowledge regarding nutrient content of locally available foods and their optimal utilisation, and have access to quality health services.
- Various programmes conducted beyond the health sector have a profound impact on health and nutritional status of women, particularly on prevention of malnutrition. This needs to be assessed so as to find out ways in which these programmes and health interventions are complementary to each other. Effective linkages need to be in place between interventions within and beyond health sector.

8.7. Addressing Social Determinants

The framework for understanding malnutrition described elsewhere in this report, informs that occurrence of malnutrition basically arises from problems in the social and economic structures. This is further reinforced by the wide and growing nutritional disparity across economic classes, educational attainment levels, geographic locations and social groups. Social and economic reforms to promote equity among these groups must be a priority as a long term measure to prevent malnutrition, including that among women.

8.8. Knowledge Generation

The current review is focused on maternal nutrition status and the health sector interventions implemented by the Ministry of Health and Population and its external development partners. There is a need to explore:

- Health sector interventions and innovative approaches implemented at sub-national level by various non-state actors (including NGOs, community groups, academic institutions etc.)
- Programmes and activities beyond the health sector that have positive impact on reducing women's workload, promoting gender equality, and also contributing directly or indirectly to women's health and nutritional outcomes.

8.9. Use of Local Foods

- It is widely accepted that the optimal utilisation of home grown food items is both effective and sustainable towards ensuring improved nutrition of all people including women. However, nutrition education and counseling efforts are weak as health workers lack the knowledge and skills to create awareness among women so that they can solve their nutrition problems themselves without relying heavily on external support.
- Research is needed to identify the nutritional values of indigenous foods and simple methods for their preservation and utilisation at household level.

8.10. Community to Community Exchange

- Nutritional status of women in some communities is better than others. This may be explained by the varying social and economic contexts among different locations. There are beneficial indigenous food and care practices in many communities which need to be explored and documented so that lesson can be drawn for adaptation in other similar communities across the country. Cross fertilization of beneficial knowledge and practices among various communities should be promoted.

Annex

Terms of Reference

The Lancet series on maternal and child under nutrition (2008) identified that the status of mother's and children's nutrition has not improved as expected in many developing countries. In our country also, a significant proportion of women are affected by undernutrition, as illustrated by the fact that 24% of them have low body mass index connoting to inadequate access to food. There is need to identify effective interventions that would accelerate the pace of improvement in improvement in maternal nutrition in the country.

Specific Objectives:

- To review maternal nutrition status and trends in the country
- To identify the gaps in existing programmes/interventions
- To suggest effective strategies that would address not only the manifestations of maternal under nutrition but also the determinants.

Expected Outputs:

- Documentation of maternal nutrition status, trends and beneficial local practices
- Identification of priority interventions for accelerating improvement in maternal nutrition.