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# Improving Maternal Malnutrition in Nigeria

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## Abstract

Maternal mortality rates (MMR) are unacceptably high in Sub-Saharan Africa. In Nigeria for example, MMR have been reported to be 630 deaths per 100,000 live births, thus ranking Nigeria 11th country in the world with highest MMR, among 184 countries [1]. Malnutrition has been identified as a key underlying cause for maternal deaths in Africa. Malnutrition pre-disposes women, particularly pregnant and lactating women, to various forms of health conditions such as increased risk of infection, anaemia, visual impairment, goitre among others. These in turn lead to gestational and postnatal complications such as obstructed labour, gestational diabetes, hypertensive disorders, haemorrhage and in fatal cases, death. Malnutrition also increases the risk of intra-uterine growth retardation (IUGR) and neural tube defect in the children born to these malnourished women. Environmental and economic conditions have huge impacts on the nutritional status of women in Sub-Saharan Africa; poverty in this population limits food choices, thus affecting their quality of diet and ultimately, nutrient absorption. Micronutrient malnutrition, also called hidden hunger, is the main form of malnutrition found among pregnant and lactating women in Africa, this coupled with under nutrition have severe implications on the well-being of these women. Research has however shown what works. Micronutrient supplementation and food-based strategies such as diet diversity, food fortification and biofortification have been reported in many studies as vehicles to combat the malnutrition scourge in Sub-Saharan Africa. This review aims to discuss the nutritional status of pregnant and lactating women in Nigeria; the different forms of malnutrition found within this population will be reviewed, with particular focus being on the food-based strategies to address them.

***Keywords:*** *Malnutrition; biofortification; Fortification; Nigeria*

## Introduction

Adequate nutrition is necessary for national development and also individual well-being. Poor nutrition creates problems for the entire population, with pregnant women, lactating women and children being particularly at risk due to their unique physiology and high requirements.

Good nutrition is important for the health of a woman and as well, for the health of her children. Implications of poor nutrition in women include poor pregnancy outcomes, high susceptibility to diseases with slow recovery rates and reduced productivity. Among pregnant women in particular, malnutrition can increase the risk of obstructed labour, cause poor foetal development, and prevent production of high quality breast-milk [2]. It can also increase the risk of death due to post-partum haemorrhage and overall morbidity and mortality in both the mother and child; UNICEF [3] reported the prevalence of maternal mortality in Nigeria to be 30%.

A breastfeeding woman with poor nutrition will have low quality breast-milk output with poor nutrient concentrations. Also, in a bid to maintain adequate nutrient compositions of the breast-milk, a lactating mother's own nutrient stores are depleted [4]. Therefore, maintaining a healthy nutrition among lactating women is of utmost importance.

**Malnutrition in Women**

Malnutrition in adults, including women, can either take the form of under nutrition (thinness), over-nutrition (obesity) or micronutrient deficiency. Underweight and overweight are assessed using the height and weight indices and calculated as the body mass index (BMI). BMI is calculated as the ratio of weight to the square of height, and expressed as kg/$m^2$ that is,

$$BMI = \frac{Weight}{Height^2}$$

Depending on the calculated BMI, the different degrees of malnutrition are summarised in the table below

| Value (Kg/$m^2$) | Degree of malnutrition |
|---|---|
| <18.5 | Under nutrition |
| 18.5 – 24.9 | Normal Weight |
| 25 – 29.9 | Overweight |
| ≥30 | Obese |

***Table 1:*** *Categorisation of Malnutrition Based on Body Mass Index (BMI).*

Both obesity and under nutrition have severe consequences on the health of women. Some of these include increased rates of infection, lethargy and general body weakness - leading to reduced productivity, increased risk of maternal complication and death. Obesity in particular increases the risk of developing cardio-vascular diseases in women and in pregnancy it induces gestational diabetes and hypertension.

Micronutrient deficiency is the most common form of malnutrition found among pregnant and lactating mothers. Micronutrients are only needed in small amounts; however any form of their deficiency can be severe. In most developing countries, Nigeria inclusive, where there is high level of poverty and nutrition ignorance, low intake of micronutrients arising from sub-optimal dietary patterns have often times led to multiple micronutrient deficiency among pregnant and lactating women. Other causes of micronutrient deficiency may include presence of diseases in individuals, leading to reduction in the absorption of micronutrients from foods. Severe effects of these are observed in the national productivity and economic development with huge cost implications on improving public health and preventing loss of man-power. In developing countries, the common forms of micronutrient deficiency among women are iron deficiency, causing iron deficiency anaemia (IDA); vitamin A deficiency, causing Vitamin A deficiency disorder (VADD); iodine deficiency, causing iodine deficiency disorder (IDD) [5].

IDA is the most prominent among these deficiencies, and is of great public health concern even in developed countries. IDA affects more women than men, and symptoms include lack of energy, feelings of weakness, decreased performance, urge to eat dirt and other non-food substances among others [5]. IDA is a major cause of perinatal and maternal mortality; it increases the risk of premature delivery and low birth weight [2]. According to a nationwide food consumption and nutrition survey conducted in Nigeria, IDA was found among 34% of children below 5 years, 24% of mothers and 48% of pregnant women [6].

VADD increases the risk of diseases and death due to severe infections. The deficiency is often characterised by impaired vision. In pregnant women, VADD leads to night blindness and increased risk of mortality [5]. According to Maziya-Dixon., et al. [6], prevalence of VADD in Nigeria, in children below 5 years of age was 23.2%; among women, 13%; while for pregnant women, prevalence was 19%.

Foetal brain damage, congenital malformation, abortion, stillbirth and prenatal deaths are characteristics associated with IDD. Among women, and adults in general, deficiency of iodine is characterised by goitre - enlargement of the thyroid gland. In the Nigeria population, about 60 million people are reported to be at risk of goitre, particularly along regions where people live on cassava-based foods [7]. Among pregnant women, a prevalence of 10.5% has been reported for IDD in Nigeria [6].

Other micronutrient deficiencies among pregnant and lactating women include zinc and folate deficiencies. Zinc deficiency impairs growth and behaviour changes and it is a leading cause of diarrhoea [8]. A prevalence of 28% and 42% was reported for zinc deficiency among mothers and pregnant women respectively in the Nigeria food consumption and nutrition survey [6]. Folate plays an important role in foetal development; low stores of folate in pregnant women can lead to a condition called neural tube defect in the foetus. It can also increase the risk of pre-term delivery and low birth weight.

**Roadmap to Combating Malnutrition**

Globally, various attempts are being made by public health experts to combat malnutrition, particularly, micronutrient deficiencies among populations. Chief among these interventions is the use of supplements. Table 2 shows the required regimen for micronutrient supplementation for pregnant and lactating women.

| Supplement | Timing | Dosage |
|---|---|---|
| Vitamin A[2,a] (in vitamin A-deficient populations) | **During pregnancy:** After the first trimester | 10,000 IU daily or a maximum of 25,000 IU weekly |
| | **During lactation (after delivery):** As soon as possible, but not later than 8 weeks after delivery | Single dose of 200,000 IU |
| Iron/Folate[3-4,b] | **Prevention of anemia**<br>Anemia prevalence >40%: 6 months during pregnancy through 3 months postpartum<br>Anemia prevalence ≤40%: 6 months during pregnancy | 60 mg iron and 400 µg folic acid daily |
| | **Treatment of anemia**<br>Until resolved or a minimum of 3 months, then continue with prevention regimen | 120 mg iron and 800 µg folic acid daily |
| Iodine[5] | Before conception or as early in pregnancy as possible in high risk areas where iodized salt is not available | Single dose of 400–600 mg (2 or 3 capsules) |

2. WHO. Safe Vitamin A Dosage during Pregnancy and Lactation, 1998.
3. UNICEF/UNU/WHO. Iron Deficiency Anaemia: Assessment, Prevention, and Control, 2001.
4. Stoltzfus RJ, Dreyfuss ML. Guidelines for the Use of Iron Supplements to Prevent and Treat Iron Deficiency Anemia, 1998.
5. WHO. Postpartum Care of the Mother and Newborn: A Practical Guide, 1998.

***Table 2:*** *Micronutrient Supplementation during Pregnancy and Lactation.*
*(Source: Linkages Project, 2004)*

**Food Based Solutions**

As earlier mentioned, pregnant and lactating women require higher nutrients; as such, deliberate attempts at getting the required nutrients through diverse means must be pursued. Other interventions to combat malnutrition among pregnant and lactating women have thus focused on food-based approach, including promotion of dietary diversification with nutrition education, food fortification and Biofortification.

**Dietary Diversification with Nutrition Education**

Women are encouraged to eat a wide variety of food during pregnancy and lactation. Table 3 summarises the increased nutrient requirements at this period and a variety of food through which these nutrient needs can be met. Dark green leafy vegetables are particularly a good source of vitamin A and folate. Animal sources including fish, red meat and poultry are needed for protein and iron while milk and milk products are essential for calcium. Consumption of a wide variety of fruits and vegetables should also be encouraged during pregnancy and lactation. Women should also be encouraged to small own homestead gardens and animal husbandry to make these foods more readily available and accessible to them and their family. Also, women need be educated on the right food combinations during pregnancy and lactation. A plate of food in every meal should essentially contain a staple + pulse + green leafy vegetables or a fruit at one meal and then at another meal, they can have a staple + animal food + green leafy vegetable or a fruit. This will ensure adequate nutrition and sourcing of essential nutrients from diverse sources.

**Fortification**

Food fortification is another approach to addressing malnutrition, particularly the micronutrient malnutrition scourge. Fortification can take the form of mass fortification as implemented by the government through salt iodisation and Vitamin A fortification of flour,

vegetable oil and other food vehicles. In Nigeria, policies promoting food fortification have been in place since 1990 and reports have shown that nationwide goitre rates, for example, have improved from a prevalence of 20% in 1993 to 8% in 2004 [9]. Also, of recent is the promotion of home fortification through the use of micronutrient sprinkles. Individuals can have daily packs which can be added to food when consumed at home. Fortification is also sometimes targeted at individual at-risk populations, for example, production of nutrient rich snacks such as the high-nutrient biscuits for school age children developed at the Federal Institute of Industrial Research Oshodi (FIIRO).

**Biofortification**

A newer technology in the line of fortification is the use of biofortified foods to combat micronutrient deficiencies. Biofortification is the process of enhancing the nutrient content of staple crops through traditional breeding and modern technology [10]. New varieties of indigenous staple foods are being bred haven being fortified with necessary micronutrients so as to make such available at a wider scale. Presently available are orange flesh sweet potatoes, iron-rich beans, zinc wheat among others; these are being promoted for consumption to alleviate VAD, IDD and other micronutrient deficiencies. At FIIRO, research is ongoing to add value to these biofortified foods to produce a variety of food products through which maternal nutrition can be improved [11].

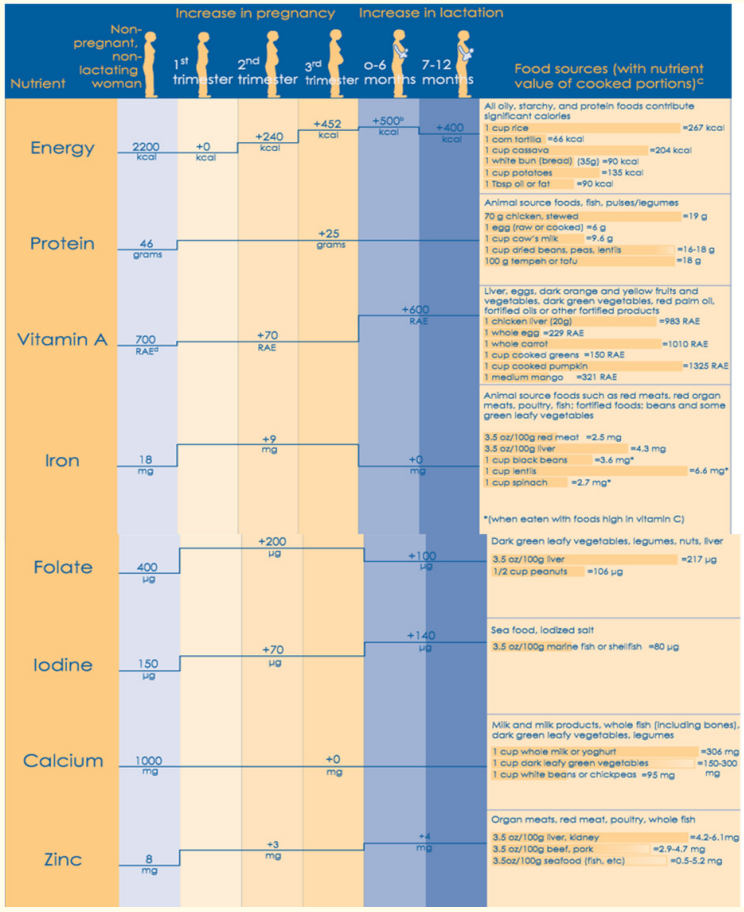


***Table 3:*** *Summary of Increased Nutritional Needs during Pregnancy and Lactation. (Source: Linkages Project, 2004)*

## Conclusion

The severe consequences of poor nutrition on maternal health cannot be over emphasised and households that are poor are particularly at risk. Interventions that have worked in different settings are available to combat the scourge of malnutrition, particularly, micronutrient deficiency.

Micronutrient supplementation during pregnancy and lactation has shown great results, however, there is need to employ a more robust and holistic approach to addressing malnutrition, through the introduction and sustenance of food-based strategies. Dietary diversification is necessary to increase the awareness and knowledge about right food combinations among women, who are also usually the primary care providers in the family. Nutrition education and promotion of small household gardens can contribute immensely to eating the right food combinations, and ultimately reducing malnutrition. Food fortification, through mass fortification or home fortification has also proved valuable in the fight against micronutrient deficiencies. More government policies and advocacy are needed to ensure producers provide adequately fortified food products to consumers. New advancements in technology, through the introduction of biofortified foods, show promising results in the fight against malnutrition. More research should be done to understand the bioavailability of the micronutrients in these nutrient-rich plant breeds, after which more efforts will be required to make the food plants widely available.

Through research and development, the food technology department of FIIRO have developed a variety of food products including nutrient-rich snacks in the form of high-density biscuits and orange-flesh sweet potato chips to combat malnutrition. Efforts are required to scaling up these technologies through government adoption or private partnerships. Scaling up these and other technologies being developed at FIIRO will further complement the present public health efforts in alleviating malnutrition among vulnerable populations in Nigeria.

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