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Examining the Role of Maternal Nutrition on Neonatal Stunting

A Policy Brief

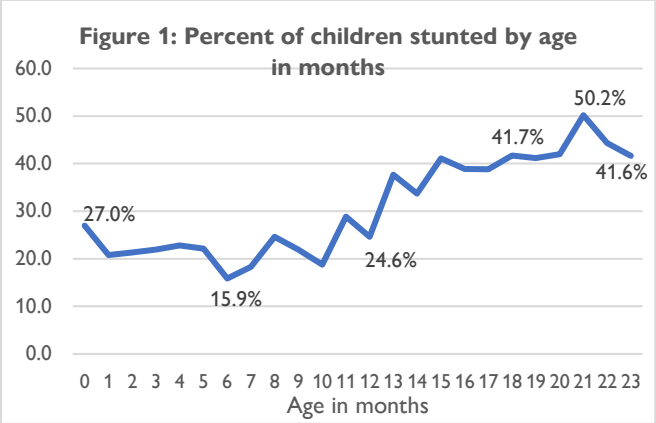
Executive Summary

Undernutrition remains an important health issue in Zambia. Data from the Most Critical Days Program (MCDP) II Baseline Survey show that as many as 27% of neonates (under 28 days of age) may begin life with short height for age measures. Stunting results from the interaction of multiple factors, one of which has been shown to be maternal nutrition. Maternal nutrition is critical to ensuring proper fetal intrauterine growth and development, yet large proportions of mothers of neonates report lower food intake in pregnancy, low dietary diversity, and low consumption of nutrient-rich foods. Maternal short stature is a strong risk factor for neonatal stunting indicating that lifelong chronic malnutrition in women may affect fetal growth and development.

Introduction

While stunting has been decreasing in Zambia in recent years, levels are still elevated, with 35 percent of children under 5 years being stunted in 2018.[1] Evidence from Zambia indicates that undernutrition begins early in life for many children. As many as 27% of children under 28 days of age are stunted[2] indicating that maternal factors predispose these children to stunting even before they are born.

Maternal nutrition is a critical determinant of proper growth of the fetus during gestation. Poor maternal nutrition before and during pregnancy is associated with low birth weight, short for gestational age, pre-term births and wasting in newborns.[3] Children born short for gestational age can experience further growth deficit leading to more severe stunting later in life. Factors that affect fetal growth restriction include the following:



- Poor maternal weight gain in pregnancy
- Insufficient micronutrients
- Maternal anemia
- Maternal short stature (height less than 150cm)
- Infections during pregnancy, including with malaria, tuberculosis, and rubella

Policy Context

The Government of the Republic of Zambia has prioritized reduction of stunting among children less than two years of age and has developed comprehensive multi-sectoral policies to address this issue.[4]

The National Development Plan 2017-2021 highlights the importance of tackling under-nutrition but does not explicitly address maternal nutrition. The recommended programs are only briefly listed and include supplementary feedings, micronutrient fortification and supplementation, education, advocacy, and research.

Khulisa MANAGEMENT SERVICES

Through the First 1000 Most Critical Days Programme (MCPD) II, the government has proposed various interventions, among which is the promotion of maternal nutrition before, during, and after pregnancy. These include:

- Increased production and consumption of diverse food crops
- Increased production and consumption of fortified foods
- Exploring the need for micronutrient supplementation among adolescents
- Implementing nutrition interventions for school and out-of-school adolescents
- Increased women and adolescent access to nutrition services

Nutrition interventions listed in the Zambian 2018 Draft Antenatal Care (ANC) Guidelines emphasize nutritional counseling, iron folate supplementation, and energy protein dietary supplementation through linkages to nutritional programs.

Baseline Study Findings

The study of stunting among neonates is complicated because accurate anthropometric measurements at such a young age are difficult. Nevertheless, the Zambia MCPD II Baseline Survey found high levels of neonatal stunting.

This is in spite of coverage of some important interventions is high. About 97 percent of mothers of neonates report being given folic and iron supplements during pregnancy (Table 1). The majority (83.4 percent) report having received information about nutrition in pregnancy from health care workers, however, only 40.9 percent reported increasing food intake during pregnancy. Alarmingly, nearly half (48.6 percent) reported consuming less food during pregnancy. Furthermore, 82.6 percent of mothers of neonates reported not having enough food or money to buy food at some point in the previous 12 months.

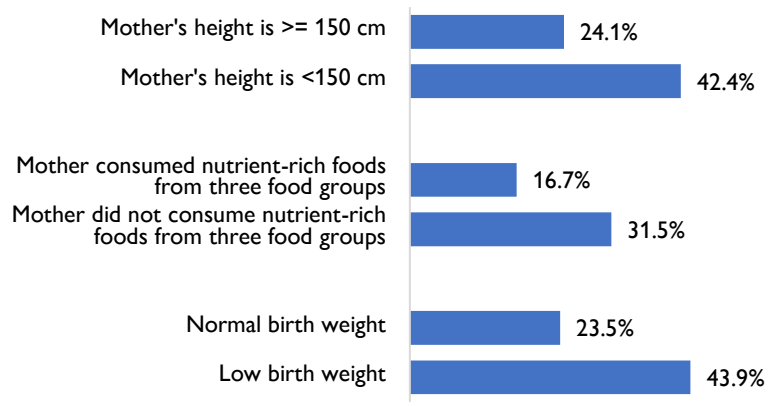
Table 1: Maternal nutritional status among mothers of neonates (28 days or younger)

Nutritional behavior	Percentage of mothers reporting (n=262)
Took folic acid during pregnancy	97.2%
Took iron during pregnancy	96.5%
Received information about nutrition in pregnancy from health clinic staff	83.4%
Met minimum dietary diversity (5+ food groups)	54.8%
Ate more food while pregnant	40.9%
Ate less food while pregnant	48.6%
Consumed nutrient-rich foods from three food groups[4]	32.2%
Consumed animal protein in previous 24 hours	63.1%
Consumed vegetables with Vitamin A in previous 24 hours	23.7%
Consumed fruit with Vitamin A in previous 24 hours	1.8%
Consumed pulses in previous 24 hours	22.3%
Consumed nuts in previous 24 hours	43.1%
Mother's height is <150cm	19.1%

The baseline data indicate that women's diets are short on micronutrients needed to support pregnancy and breast feeding.[5] Only half (54.8 percent) of mothers of neonates met minimum dietary diversity for women (consuming foods from at least 5 food groups). Less than a third (32.2 percent) of mothers of neonates consumed at least three types of nutrient-rich foods in the 24 hours prior to the survey.

The three factors most strongly and significantly associated with stunting in neonates are mother's height, the mother having consumed at least three types of nutrient-rich foods in the 24 hours prior to the survey[6], and low birth weight.

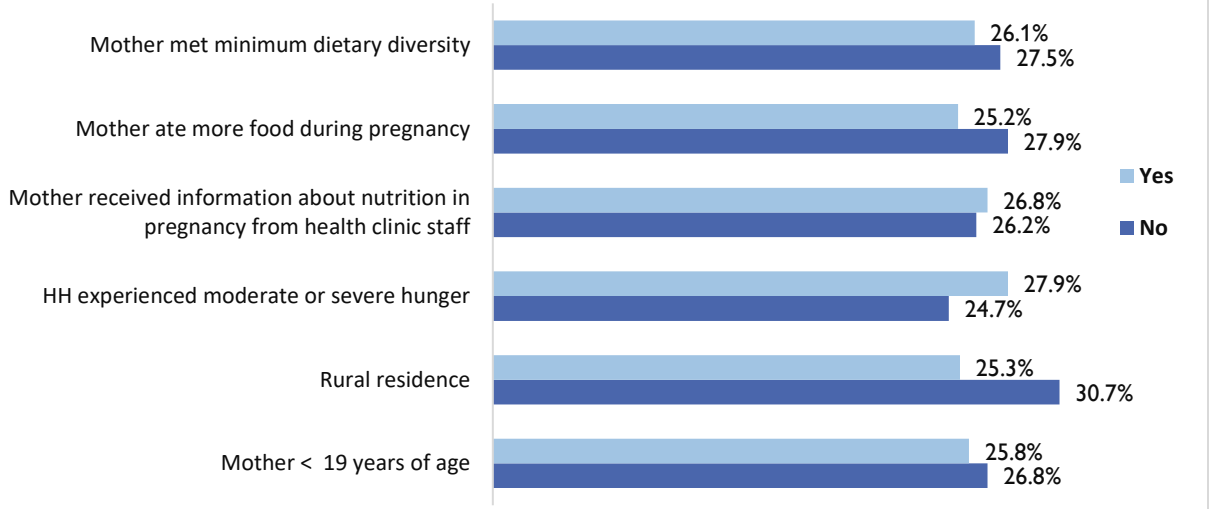
Figure 2: Percentage of neonates that are stunted, by select characteristics (n=262)



Mothers whose height is under 150cm are twice as likely to have a stunted neonate compared to women who are 150 cm or taller (Figure 2). Similarly, women who do not consume a nutrient-rich diet are almost twice as likely to have a stunted neonate compared to women that do. Low birth weight infants are twice as likely to be stunted as normal weight infants.

Stunting is somewhat lower among neonates whose mothers met minimum dietary diversity (consuming more than 5 food groups) and among those whose mothers ate more foods in pregnancy compared to mothers who ate the same or less quantity of food (Figure 3). Stunting in neonates is higher in urban areas, and among those who live in households that experienced moderate or severe hunger. Having received information about nutrition in pregnancy from health clinic staff does not appear to be associated with reduced stunting levels among neonates. While young maternal age is associated with stunting among all children under two years of age, the association with stunting is not as marked when one accounts only for neonates.

Figure 3: Percentage of neonates that are stunted, by select household and maternal characteristics (n=262).



Discussion

Poor maternal nutrition is a contributing factor in fetal growth retardation. Studies have shown that adequate weight and fat gain during pregnancy and micronutrient supplementation reduce the likelihood of low birth weight and short for gestational age.[7] During pregnancy, it is important that women increase caloric intake and have a diet rich in micronutrients to support proper growth and development of the fetus. The intake of animal protein, zinc, iron, iodine, and vitamin B12 have been demonstrated to affect linear growth in children.[8] However, instead of increasing caloric intake, over half of the mothers of neonates surveyed indicated they decreased the amounts of foods eaten during pregnancy. Women sometimes avoid specific foods during pregnancy because they are believed to negatively impact the mother or baby's health, and many women report not being able to eat during pregnancy due to nausea.[9] Furthermore, nearly 68 percent of mothers are not consuming a micronutrient-rich diet. Other studies confirm that Zambian women have high levels of deficiency in multiple micronutrients.[10]

The high level of stunted neonates among women of short stature reflects the impact of chronic malnutrition the mothers faced over their lifetime and shows how stunting and poor nutrition can be passed from one generation to another. Nearly one in five new mothers surveyed had short stature (less than 150cm). This indicates that many women in Zambia enter pregnancy with serious life-long nutritional disadvantages that impact the growth of their child. Many of these stunted children are also of low birth weight indicating they are at increased risk for adverse neonatal outcomes. Furthermore, studies have found that infants born to women of short stature are at additional risk of poor linear growth in their first year of life.[11]

We could not find evidence that women of short stature are specifically targeted for particular nutrition interventions prior to pregnancy or through antenatal care services in Zambia. ANC guidelines[12] do not mention maternal stature as a risk factor, but key informants indicate that these women are advised to deliver in hospitals due to increased risk of complications during labor due to small pelvic size.

Interventions such as providing pregnant women with folic acid and iron supplementation during pregnancy, while widespread in Zambia, do not appear to sufficiently counteract the often-chronic malnutrition endured by many women. Almost all women interviewed reported being given iron or folic acid in pregnancy, but the frequency and adherence was not reported. According to the 2018 Zambia Demographic Health Survey (ZDHS), 77 percent of women took iron folate supplements for 90 days or more during pregnancy, suggesting the intervention could be strengthened. The ZDHS also found that as many as 41% of pregnant women in Zambia are anemic despite high levels of iron and folate supplementation. Other causes of anemia, such as infections, need to also be addressed.

While most new mothers have received education regarding nutrition in pregnancy, the data indicate that many are not able to follow the advice because they do not have access to nutritious foods. As many as four out of five women surveyed had experienced times in the preceding 12 months when they had insufficient money to buy food. Thus, interventions focused on nutrition education and behavior change will have limited impact unless the availability and affordability of nutritious foods and improved livelihoods are also addressed. Evidence from the evaluation of Zambia's First MCDP and other studies supports this finding, noting that seasonal food shortages and difficulties acquiring recommended foods were important barriers to improving diets.[13]These studies also noted that decisions about the purchase of foods are often controlled by men, who may not understand the importance of nutrition in pregnancy.

The high cost of nutrient-rich foods relative to grains, cereals, and tubers is a deterrent to their consumption.[14] In Zambia, consumption of nutrient-rich foods is higher among women living in households that produce such foods.[15] This may explain higher levels of neonatal stunting in urban areas where such

foods must be purchased. Since not all households are able to grow foods, addressing their availability through markets is critically important.

Recommendations for Policies and Programs

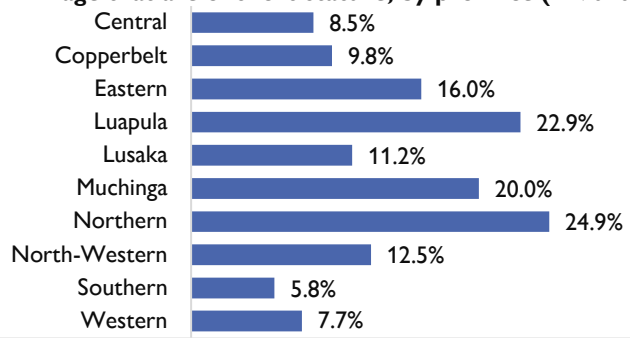
Special attention to the nutritional status of women pre-conception and during pregnancy

Given the strong association between short maternal stature and neonatal stunting, special attention should be given to the nutritional status of adolescent girls and women pre-conception and during pregnancy. Evidence shows that nutritional interventions prior to and early in pregnancy can counter some of the deleterious effects of short stature.[16] Efforts must be made to enroll expectant women into quality antenatal care early, provide IFA supplementation to all pregnant women, provide nutritional counseling for adequate weight gain during pregnancy including follow-up of for those with inadequate weight gain during ANC visits. Expectant women who are of short stature, should be given additional support for birth planning including education regarding the onset of early labor and access to deliver with a skilled attendant at a health facility. In addition, girls of short stature, preferably in adolescence, can be targeted for nutrition interventions including provision of fortified foods and micronutrient supplements.

Target stunted girls and adolescents:

Work to promote improved nutrition among girls and adolescents through health services and through community programs. Identify and target girls and adolescents with their households for increased nutritional and food security support. Engage community stakeholders to identify girls with short stature to link them to nutrition programs before pregnancy and during pregnancy. Start in the Luapula, Muchinga, and Northern provinces where there are higher levels of women of short stature. Also intensify efforts aimed at prevention of teen pregnancies and early marriages.

Figure 4: Percentage of women of reproductive age that are of short stature, by province (n=7020)



Strengthen ANC and nutritional guidelines and support for pregnant women, particularly for those of short stature:

Efforts should be made to ensure women of short stature enroll in ANC early, and that screening for short stature during ANC becomes routine. ANC guidelines should be expanded to include recommendations for managing women of short stature through pregnancy and labor. Consider whether food supplementation for this group is feasible. Studies demonstrate that protein-energy supplementation can reduce the odds of small for gestational age births by as much as 34% for women of short stature.[17] However, these women must be closely monitored due to increased risk of labor complications for small women who deliver larger babies. Studies have also shown a benefit to providing pregnant women with multiple micronutrient supplements.[18] Nevertheless, the WHO cautions that the evidence on multiple micronutrient supplementation in pregnancy is not conclusive and that further research is needed before it can recommend this as a widespread intervention.[19] Zambia, with high levels of mothers of short stature, may benefit from such research.

Target low birth weight infants of short-stature women:

Low birth weight infants of short-stature women in particular must be flagged as they have greater risk of poor linear growth in their first year of life.[20] While Zambia already provides support to low birth weight babies, additional support and closer monitoring of those born to women of short stature should be prioritized. Consider adding protocols for nutrition support to such children.

Renew focus on maternal anemia

While progress has been made in increasing iron folate coverage in pregnant women, there is still room for improvement to ensure women are taking the proper quantities and to reduce the high levels of anemia among pregnant women (41 percent per the 2018 ZDHS). This will require increased and earlier access to ANC. However, efforts should also be made to reduce anemia prior to pregnancy. Consider scale up of iron supplementation to include adolescent girls and increase intake of iron-rich foods among the women of reproductive age. In addition to low or poor iron and folate intake, HIV, malaria and Helminth infection contribute to high levels of anemia so increased screening and treatment for these infections is important.

Increase the availability of nutrient-rich foods year-round across the country

As noted above, nutrition counseling and education are unlikely to succeed unless nutrient-rich foods become more widely available and affordable. Zambia must accelerate efforts to increase the production of nutrient-rich and biofortified foods for national and local consumption as outlined in the National Food and Nutrition Strategic Plan (2017-2021) and the Second National Agricultural Policy (2016)[21]. The MCPD states this as an objective and works with farmers to plant diversified and nutrient-rich crops. In addition to increasing their production, it is important to ensure that the crops are accessible through local markets and also affordable to those most in need. Additional research would be beneficial to understand who benefits from these agricultural interventions and whether the most malnourished populations and the urban poor (who experience higher levels of neonatal stunting) are able to diversify their diets as a result. Consider providing incentives to medium and large-scale farmers to shift to nutrient-rich crops and sell on local markets. Encourage diversification of crops so that nutrient-rich fruits and vegetables are available year-round. The current National Development Plan 2017-2021 highlights export-oriented agriculture as a key economic strategy and recommends the sector focus on high-value export crops and linking farmers to international value chains. However, this approach must be balanced with agricultural production that meets the nutritional needs of the Zambian population.

Since nutritious foods are not currently widely available or affordable for many, the government should continue to support and expand efforts to make fortified foods readily available.

Endnotes

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ABOUT SCALING UP NUTRITION Zambia

The Government of the Republic of Zambia (GRZ) is a member of Scaling Up Nutrition (SUN)—a global movement uniting governments, civil society, businesses, and citizens in a worldwide effort to end undernutrition. Phase 1 of the Zambia SUN programme began in 2013 with the goal to reduce stunting among children less than 24 months old in 15 districts.

Currently in its second phase, SUN has increased from 15 to 30 districts, coordinated by the National Food and Nutrition Commission of Zambia, and supported by a variety of partners and donors, including USAID/Zambia who supports the SUN programme through the SUN Learning and Evaluation (SUN LE) project.

This Policy Brief was made possible with the generous support of the American people through the U.S. Agency for International Development under USAID contract no. 72061119C00003.

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