

Zerfu TA, Umeta M, and Baye K. **Dietary Diversity During Pregnancy is Associated with Reduced Risk of maternal Anemia, Preterm Delivery, and Low Birth Weight in a Prospective Cohort Study in Rural Ethiopia.** The American Journal of Clinical Nutrition, 2016; 103: 1482-8.

## Introduction

Adequate maternal nutritional status before and during pregnancy is important for healthy pregnancy outcomes [1]. Poor maternal nutrition is associated with intrauterine growth restriction, low birth weight, and preterm birth, and it increases the risk of neonatal deaths [2], as well as post-natal stunting [3].

In low and middle income countries (LMICs), diets of pregnant women are predominantly plant-based, and provide imbalanced macronutrients and inadequate micronutrients [4]. Dietary diversity has been suggested as a qualitative measure of food consumption that reflects access to a variety of foods and food groups, and can be used as a proxy for nutrient adequacy of the diet of at population level[5]. This issue of NNA summarizes a paper recently published in The American Journal of Clinical Nutrition which presented results of a cohort study investigating the association between dietary diversity during pregnancy and perinatal outcomes in Ethiopia, including maternal anemia, low birth weight (LBW), preterm birth (PTB), and stillbirth.

## Methods

In this prospective longitudinal cohort study, pregnant women were identified during antenatal care visits at 8 randomly selected health centers in 4 rural districts in the Oromia region of Ethiopia. At enrollment, a 24-hour dietary recall of all foods consumed was collected following guidelines for measurement of individual dietary diversity by the Food and Agriculture Organization of the United Nations (FAO) [5]. The foods were categorized into 9 food groups: a) cereals, root and tubers; b) vitamin A-rich fruit and vegetables; c) other fruits; d) other vegetables; e) legumes and nuts; f) meat, poultry and fish; g) fats and oils; h) dairy; and i) eggs. The 432 eligible pregnant women were identified as belonging to one of two dietary diversity groups based on the Women's Dietary Diversity Score (WDDS): 1) adequate (WDDS  $\geq 4$  food groups) and 2) inadequate (WDDS  $< 4$  food groups). Each month from enrollment to delivery, a 24-hour dietary recall was repeated. The women remained in the adequate or inadequate WDDS group if their WDDS were consistent for at least 3 of the four dietary recalls. Data were collected during pre-harvest (August-October) and post-harvest (November-January) seasons. Data on maternal socioeconomic and anthropometric characteristics were also collected. Hemoglobin was measured at enrollment and before delivery, and anemia was defined as hemoglobin less than 11.0g/dL. Gestational age was estimated based on the last menstrual period and fundal height. Birth weight was measured immediately after delivery. Stillbirth was defined as absence of signs of life after 24 completed weeks of gestation and PTB when birth occurred before 37 weeks of gestation.

## Results and Conclusions

Of the 432 eligible pregnant women, 216 were identified as belonging to each of the two groups. From each group, 4 women were excluded because their WDDS did not meet the criteria to be adequate or inadequate for 3 out of 4 dietary recalls. Other reasons for drop out were discontinuation of ANC visits

(n=28), missing data (n=12) and home delivery (n=18), which did not differ between the groups. The two groups were similar in terms of parity and selected socio-economic characteristics, such as monthly income. However, women in the adequate WDDS group were younger, had a higher number of completed school years, higher hemoglobin concentrations, greater height and larger MUAC than women in the inadequate WDDS group. Women in the adequate WDDS group consistently consumed more dairy, animal-source foods, fruit and vegetables throughout the follow-up period than those in the inadequate group ( $p < 0.05$ ). The proportion of pregnant women taking iron and folic acid supplements was very low, and did not differ by WDDS group. At enrollment, 37.6% of women in the inadequate group were anemic compared with 19.7% in the adequate group. After controlling for baseline differences, pregnant women in the inadequate WDDS group were 2-fold more likely to be anemic (adjusted RR (ARR): 2.29; 95% CI: 1.62, 3.24), 4.7-fold more likely to deliver prematurely (ARR: 4.61; 95% CI: 2.31, 9.19), and twice as likely to deliver a LBW infant (ARR: 2.06; 95% CI: 1.03, 4.11) as those in the adequate WDDS group. There was no difference between the 2 groups in the risk of stillbirth (ARR: 2.71; 95% CI: 0.88, 8.36).

### Policy implications

The findings of this study suggest that adequate dietary diversity, defined as WDDS  $\geq 4$ , during the second and third trimester of pregnancy is associated with a reduced risk of maternal anemia, LBW and preterm birth among pregnant women in rural Ethiopia. This association suggests that adequate dietary diversity may be helpful for reducing the risk of maternal anemia, preterm birth and LBW, although this should be confirmed by intervention trials.

### NNA Editor's Comments \*

The present study used a prospective cohort study design, which means that groups of individuals are assigned to a study group based on their reported practices and/or other characteristics. The authors defined dietary diversity based on consistency of maternal reports over a 4-month period. This approach of repeated WDDS gives strength to the study.

However, the study design presents several limitations, as the groups differed by baseline characteristics. These differences may also be connected with other practices and unmeasured characteristics which may be associated with the final outcomes. Thus, as the authors acknowledge, dietary diversity may not be causally related to the reported outcomes and the findings of this study need to be interpreted cautiously.

We take this opportunity to share an update on the dietary diversity score because FAO have recently proposed a new dichotomous indicator called 'Minimum Dietary Diversity for Women' (MDD-W) [6]. Similar to the WDDS, the MDD-W is suggested as a proxy for assessing one dimension of dietary quality, in particular adequacy of 11 micronutrients [7]. The main difference between the two indicators is that the MDD-W is based on 10 food groups and the WDDS on 9, but that the MDD-W performed better to detect micronutrient adequacy in a number of settings [7]. Both the WDDS and MDD-W are useful for population-level assessments only and do not reflect individual dietary quality because of normal day-to-day variation in dietary intakes.

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