

# Exploring the Effects of a Food Supplement Given to Pregnant Vietnamese Women on Birth Outcomes

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## Introduction

A nutrient-rich diet is important for a healthy and safe pregnancy and a healthy newborn since babies receive most of their nutrients from their mothers' diet (Nga, 2020). Low birth weight and premature babies have been linked to poor maternal nutrition. In many low-income countries, it is difficult for mothers to obtain a nutrient-rich diet during pregnancy. In high-income countries, like the United States, health care providers will often recommend certain nutritious foods and special supplements to promote a baby's growth and development. This situation is not the case for low-income countries as many mothers do not have access to healthy foods and practically no access to supplements. In this study, we are interested in investigating the effect of a nutrient supplement on birth outcomes. Our two research questions of interest are:

- Is there a difference between birth weight of infants born to mothers who received routine prenatal care and those who received a supplement?
  - Between those who received a supplement, does the duration of supplement intake (full term or half term) affect the birth weight of infants?
- Is there a difference between maternal gestational weight gain (defined as the amount of weight gained from conception to the birth of the infant) in mothers who received routine prenatal care and those who received a supplement?

## About the Data

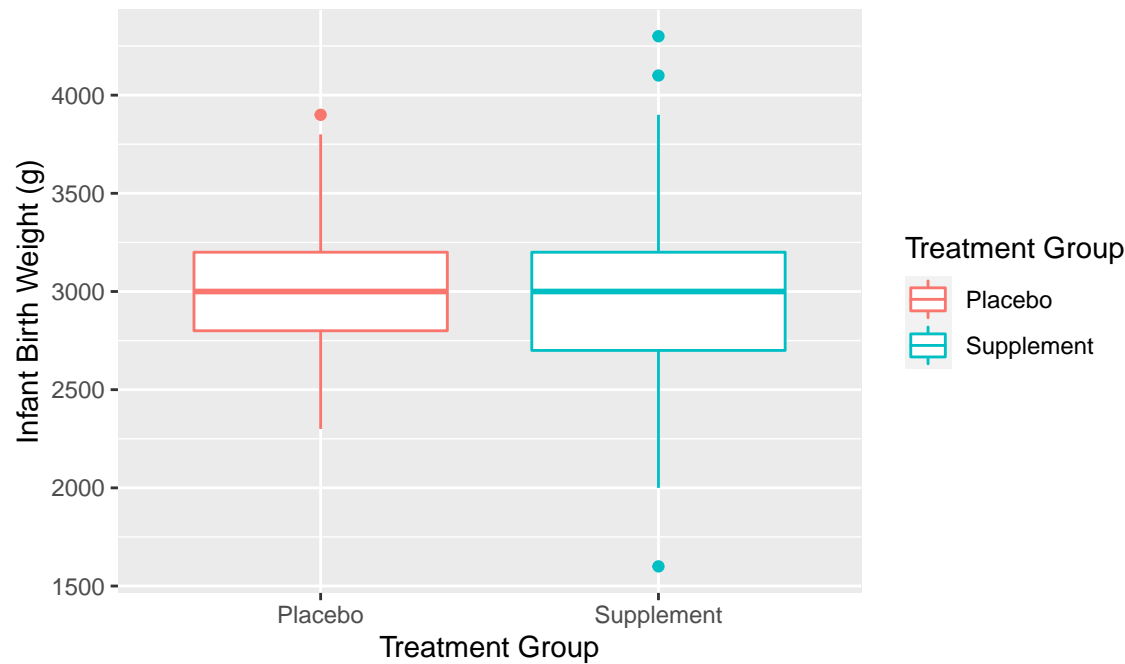
Our data set comes from a randomized, controlled trial published in PLoS ONE and funded by the Nestle Research Foundation. The trial was interested in determining if a food supplement, created from local animal-sourced foods and vegetables, would improve birth outcomes if given to mothers during pregnancy. 460 rural Vietnamese women between the ages of 18 to 30 were enrolled in the study. 317 of the original 460 women completed the study, and the others either moved from the area or did not give birth during the data collection period. The women were assigned to 3 different groups: receiving supplement from pre-conception to birth (110 women), receiving the supplement from mid-gestation to birth (101 women), and no supplement/routine prenatal care (106 women). Data was collected on the mother's demographic and biological characteristics before and during pregnancy, the mother's vitamin intake during pregnancy, and the baby's biological and physical characteristics at birth. Based on the original study's findings, we hypothesize that a nutrient supplement will not have an effect on birth weight or on maternal gestational weight gain. The study did not analyze the difference in infant birth weights between mothers who received the different durations of the supplement, but we hypothesize that there will be no difference. We will be analyzing these differences using multiple linear regression and hypothesis testing.

## Exploratory Data Analysis

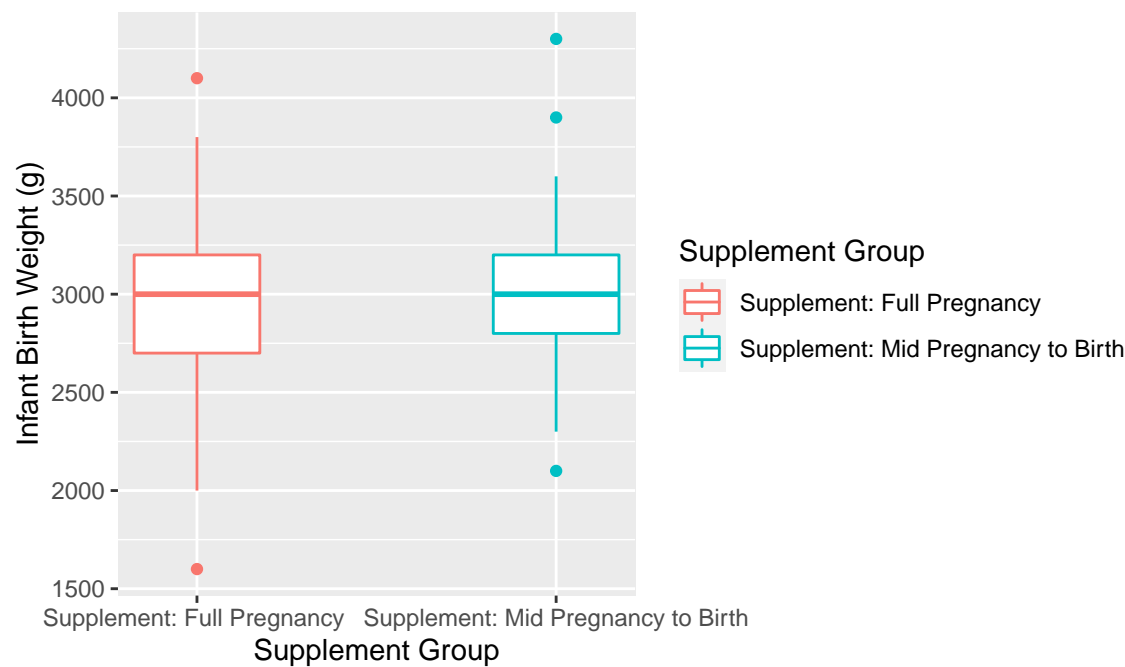
The two response variables we are interested in examining are the birth weight of infants in grams and the mother's gestational weight gain in kilograms. The overall average birth weight was 3006.3 g. Among mothers who received the supplement full term, the average birth weight was 2991.8 g. Among mothers who received

the supplement half term and mothers in the placebo group (receiving routine maternal care), average birth weight was 2983.2 g and 3043.3 g respectively. Due to the similar distribution and average birth weight between the placebo group and treatment group as well as between the supplement groups, there may be evidence that supplement intake and length of intake do not have an effect on infant birth weight.

Distribution of Birth Weights Similar between Placebo and Treatment Group

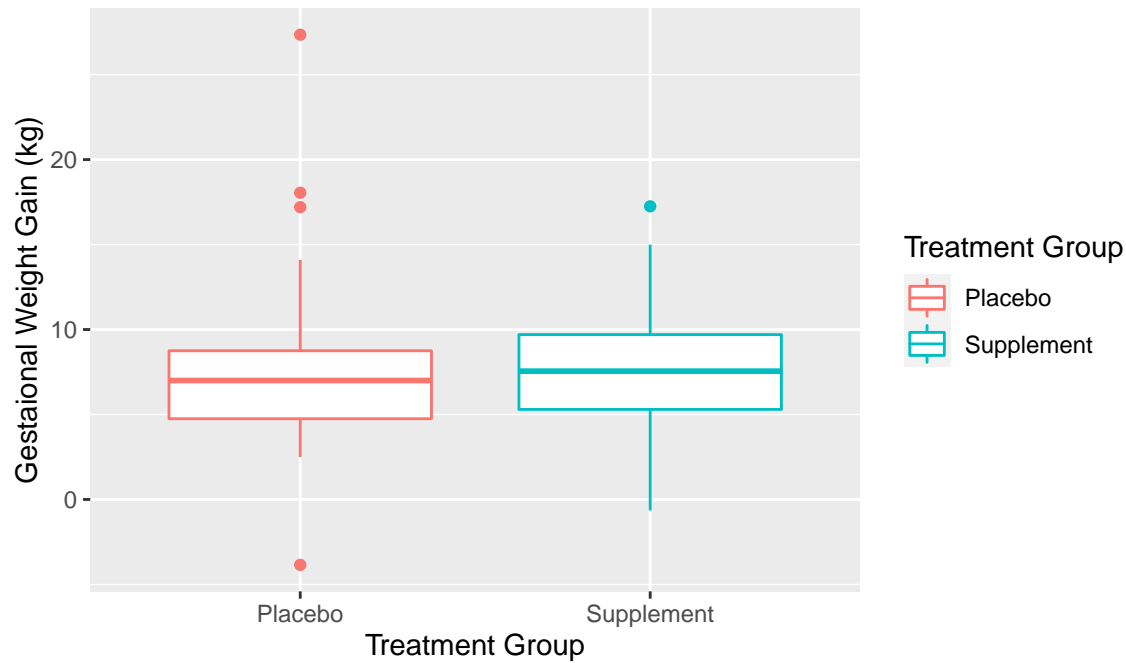


Distribution of Birth Weights Similar between Supplement Groups

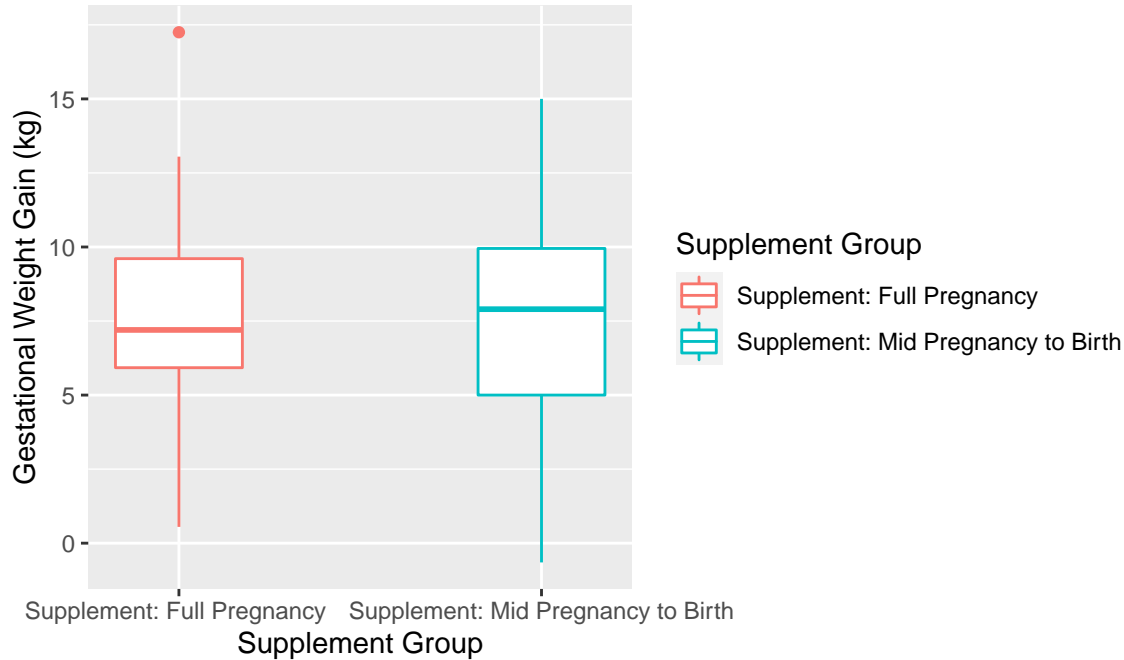


The overall average gestational weight gain was 7.4 kg. Among mothers who received the supplement full term, the average weight gain was 7.5 kg. Among mothers who received the supplement half term and mothers in the placebo group (receiving routine maternal care), average weight gain was 7.6 kg and 7.3 kg respectively. These differences may suggest that the supplement has a positive effect on maternal gestational weight gain, especially when only taking it from mid-pregnancy to birth compared to taking it the whole pregnancy. It is important to note that about half the observations for gestational weight gain were missing, so we omitted these observations.

### Mothers in the Treatment Group had Higher Gestational Weight Gain



## Mothers Receiving the Supplement Starting at Mid–Pregnancy had Higher Gestational Weight Gain



More information on the explanatory variables used in our analysis can be found in Appendix *Section 1*. In general, missing data in the numeric variables were imputed using the average value for that variable by each treatment group. Missing data in the categorical variables were imputed using the most frequent level in the variable since these variables are often skewed.

## Appendix

### Section 1. Description of Variables Used

- **Variables of Interest**
  - `bwgt_hosp`: birth weight of infant (in grams)
  - `gestationalweightgainkg`: gestational weight gain of mother (in kilograms)
- **Explanatory Variables**
  - `treatment_group`: new variable created that indicates treatment group with levels: routine prenatal care and supplement
  - `preterm`: binary variable with 1 = infant was born premature and 0 = infant was not born premature
  - `sga_wgt`: binary variable with 1 = infant is small for gestational age and 0 = infant is normal for gestational age
  - `gestationalage_weeks`: gestational age of infant (in weeks)
  - `gender`: binary variable with 1 = female and 0 = male
  - `education`: highest education completed of mother with levels: elementary school, high school, middle school, occupational or above
  - `workasfarmer`: binary variable with 1 = mother works as farmer and 0 = mother does not work as farmer
  - `maternal_age_years`: age of mother
  - `maternal_hgt_prepreg_cm`: height of mother before pregnancy (in cm)
  - `maternal_bmi_prepreg`: bmi of mother before pregnancy

## References

Nga, Hoang T., et al. "Effect of a Nutrient-Rich, Food-Based Supplement given to Rural Vietnamese Mothers Prior to and/or during Pregnancy on Birth Outcomes: A Randomized Controlled Trial." PLOS ONE, vol. 15, no. 5, Public Library of Science, May 2020, p. e0232197. PLoS Journals, doi:10.1371/journal.pone.0232197.