

Combined iron/folic acid supplements and malaria prophylaxis reduce neonatal mortality in 19 sub-Saharan African countries

Titaley CR, Dibley MJ, Roberts CL, Agho K. *Am J Clin Nutr* 92: 235-43, 2010.

Introduction

In this issue of Nutrition News for Africa, we review a recent study which evaluated the relationships between maternal iron/folic acid supplementation (Iron-FA) and/or intermittent preventive treatment of malaria during pregnancy and neonatal mortality (1). The analyses were motivated by an earlier intervention trial conducted in a non-malaria endemic region of China, which found reductions in neonatal deaths among infants of women who received Iron-FA compared with those who just received FA (2). The objective of the present analyses was to assess whether similar beneficial results might occur in malaria endemic regions of sub-Saharan Africa (SSA). The authors used available data from nationally representative Demographic Health Surveys (DHS) in 19 malaria endemic SSA countries to identify factors associated with neonatal death, and in particular whether the mother received Iron-FA and/or anti-malaria prophylaxis during pregnancy.

Study methods

For these analyses, data were obtained from DHS surveys completed in 19 SSA countries in which: 1) the population level of endemic malaria was estimated or known to be $\geq 80\%$; 2) survey data were available from 2003 or later; and 3) the available DHS data included information on socio-demographics, birth characteristics and pregnancy or delivery services. The countries that fit these criteria, in ascending order according to the reported neonatal mortality rate (with DHS year), were: Zimbabwe (2005/2006), Malawi (2004), Cameroon (2004), Uganda (2006), Burkina Faso (2003), Madagascar (2003/2004), Tanzania (2004/2005), Liberia (2007), Benin (2006), Congo (2005), Niger (2006), Zambia (2007), Senegal (2005), Chad (2004), Guinea (2005), Democratic Republic of the Congo (2007), Ghana (2003), Mali (2006), and Nigeria (2003). Data were available for 101,636 singleton live-born infants from the most recent pregnancy of ever-married women in the 5 years prior to the respective survey and for 2001 neonatal deaths. The main outcome variable was neonatal death, which was defined as the death of an infant within the first 30 days of life. Exposure variables were Iron-FA supplementation and malaria prophylaxis, which was sub-divided into intermittent preventive treatment with sulfadoxine-pyrimethamine (SP-IPTp) or other malaria prophylaxis. A composite variable was created for Iron-FA and type of malaria prophylaxis to evaluate different combinations of these interventions on neonatal death. Two more groups of variables, 1) socio-demographic and birth characteristics and 2) antenatal care services (ANC) and delivery care services, were constructed using pertinent data.

Results

Overall, the risk of neonatal death (hazard ratio) was significantly greater among first born infants, infants born with < 2 year birth intervals, infants perceived by their mother to be smaller or larger than average, male infants, infants born to mothers > 30 years of age, and infants with cesarean deliveries. The risk of neonatal death was significantly lower among infants whose mothers reported participating in ANC. Overall, 66% of mothers received Iron-FA, 20% received SP-IPTp, and 16% received both interventions. When ANC was replaced in the model by Iron-FA supplementation, SP-IPTp and tetanus vaccinations (50% of mothers), the risk was significantly lower when the mother took any Iron-FA. The risk of neonatal death was also lower among infants whose mothers received SP-IPTp and ≥ 2 tetanus vaccinations, although the latter two relationships were not statistically significant. Breastfeeding was also associated with lower neonatal mortality, although this could have been due to reverse causality.

When the authors controlled for antenatal, delivery and post-delivery care received, they found that neonatal death was significantly reduced by 24% among infants whose mothers received both Iron-FA and

SP-IPTp. They also found a dose response effect of Iron-FA among women who consumed Iron-FA supplements and any type of malaria prophylaxis, with a reduction of neonatal death of 24% among infants of mothers who received ≥ 90 days of Iron-FA, and just 18% reduction among infants whose mothers received < 90 days of Iron-FA.

NNA Editors' comments*

Considering that few countries in sub-Saharan Africa are on track to reaching the Millennium Development Goal to reduce infant mortality by two-thirds between 1990 and 2015, the findings of this study are very compelling for the region. Although the results rely on retrospective analysis of self-reported information collected during cross-sectional surveys, the reported associations are supported by the large sampling of available data for births and neonatal deaths across multiple countries. The statistical control for potential confounders and the dose-response relationship with Iron-FA supplementation lend further strength to the conclusions of the analysis. This study adds to the base of evidence demonstrating the importance of maternal nutrition during pregnancy for early child survival, and this information provides strong support for the need to continue and/or increase the use of Iron-FA supplementation during pregnancy and to add SP-IPTp in malaria endemic regions. These interventions are of particular interest considering the finding that Iron-FA/SP-IPTp interventions during pregnancy may reduce the risk of neonatal mortality even in settings where other prenatal care is lacking.

Citation

1. Titalay CR, Dibley MJ, Roberts CL, Agho K. Combined iron/folic acid supplements and malaria prophylaxis reduce neonatal mortality in 19 sub-Saharan African countries. *Am J Clin Nutr* 92: 235-43, 2010.
2. Zeng L, Dibley MJ, Cheng Y, Dang S, Chang S, Kong L, Yan H. Impact of micronutrient supplementation during pregnancy on birth weight, duration of gestation, and perinatal mortality in rural western China: double blind cluster randomised controlled trial *BMJ* 337: a2001, 2008.



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