

## Association of Food with Blood and Food Lead Levels among Pregnant Women of Sindh, Pakistan

Shahla Naeem, Ayesha Zahid Khan, Ambreen Sahito, Abdul Ghani, Ghazala Rafique, Fujio Kayama and Zafar Fatmi  
Shahla Naeem, Pakistan

**Introduction:** Lead is one of the most hazardous chemical for health of the population. With increasing control of lead in gasoline, food has emerged as one of the main contributor for lead exposure worldwide. Therefore, we assessed all food items which elevate blood lead levels among pregnant women of Sindh, Pakistan. We also assessed food items which contribute more in elevating food lead levels which is taken by those women and children.

**Methods:** A cross sectional study was conducted between November 2014 to March 2016, in Karachi (urban) and Gambat (rural), Khairpur district in Sindh. A total of 103 venous blood samples (63 from Karachi and 40 from Gambat) of pregnant women were measured for lead levels at the time of delivery. After one month of delivery, a modified structured validated food frequency questionnaire was administered using food groups and food items. Multivariable linear regression was conducted to identify food items which correlated with blood lead levels and food lead levels of mothers, separately.

**Results:** With 90% confidence interval, bread ( $\beta=0.199$ ,  $p\text{-value}=0.003$ ), boiled rice ( $\beta=0.354$ ,  $p<0.001$ ), cooked root vegetables ( $\beta=0.158$ ,  $p<0.01$ ), fried savory items ( $\beta=0.148$ ,  $p\text{-value}=0.03$ ), sweet snacks ( $\beta=0.129$ ,  $p\text{-value}=0.079$ ) were positively associated with elevated mother blood lead levels. While lassi ( $\beta=-0.308$ ,  $p<0.01$ ), market milk desserts ( $\beta=-0.219$ ,  $p=0.002$ ), fish ( $\beta=-0.161$ ,  $p=0.016$ ), soft drinks ( $\beta=-0.191$ ,  $p=0.005$ ) and supari/gutka ( $\beta=-.131$ ,  $p\text{-value}= .063$ ) were negatively associated with elevated mother blood levels. Tetra pak market juices ( $\beta= .295$ ,  $p\text{-value}=0.004$  and cooked root vegetables ( $\beta=0.192$ ,  $p\text{-value}= 0.051$ ) were positively associated with mother food lead levels at 90% CI. Multivariate models were also adjusted for residence. Objective assessment of food items with mother blood lead level showed that paratha ( $\beta=0.338$ ,  $p\text{-value}=0.001$ ) and vegetables cooked without potato ( $\beta=0.132$ ,  $p\text{-value}=0.093$ ) were positively associated with blood lead level at 90% CI.

**Conclusion:** Bread, boiled rice, fried savory items, sweet snacks and cooked root vegetables are contributing in elevated blood lead levels of mother's in Pakistan. These food items may be contaminated with lead during processing, packaging and storage. Supari/gutka and soft drinks may be decreasing overall absorption of lead through gut including food nutrients so they are contributing in decreasing blood lead level. Objective analysis of food items are warranted for further intervention.

**Key words:** Mother blood lead levels, Mother food lead levels, food frequency, food duplicates, Pakistan