# 母親國籍、生活習慣與胎兒金屬累積暴露之相關研究

# The research of the correlation between mother's nationality, life style and the fetal accumulative exposure of metals.


## 中文摘要

嬰兒出生第一次的排泄物爲胎便，組成物包括腸胃道中的表皮細胞、胎毛、胎脂、羊水等等，胎便可以反映出胎兒腸內金屬和無機物的累積量。本研究設計爲橫斷性研究，以新生兒胎便中金屬(鉛、鎘、汞、砷)濃度作爲其在母親子宮內金屬暴露之生物指標，並探討胎便金屬濃度與新生兒之出生狀況如：出生體重、身長、頭圍和生產週數等之相關性；評估母親基本人口學特徵、國籍與生活習慣對新生兒出生狀況及胎便中金屬濃度之影響；探討父親基本人口學特徵、抽菸、喝酒等因子對新生兒出生狀況及胎便中金屬濃度之影響。研究期間爲 2008 年 8 月至 2009 年 3 月，於台北某醫院進行收樣，個案爲母親及新生兒配對共 258 對，本國籍 197 對，外國籍 61 對，均爲自願者且懷孕期間無併發症，進行父母親基本資料蒐集與問卷訪視，收集新生兒出生第一次的胎便，以及紀錄新生兒出生狀況，並且分析胎便中鉛、鎘、汞、砷濃度，其中鉛、鎘、砷濃度使用感應耦合電漿質譜儀(Inductively Coupled Plasma Mass Spectrometry;ICP-MS)分析，胎便汞濃度使用汞分析儀(Mercury Analysis System)分析。結果發現，新生兒胎便中金屬的幾何平均濃度(dry weight)分別爲本國籍鉛 25.41± 88.76 ppb、鎘 6.60±5.29ppb、汞 79.80±4.72ppb、砷 43.05±7.13ppb；外國籍鉛 30.96±150.67ppb、鎘 6.89±1.03 ppb、汞 64.29±15.23 ppb、砷 46.10 ±3.30 ppb。新生兒母親國籍不同之間胎便中汞濃度有顯著差異(p=0.016)。母親國籍、教育程度、懷孕前服用中藥、懷孕前補牙、吃魚頻率、父母有職業暴露與新生兒胎便金屬濃度呈顯著相關。母親國籍、年齡、身高、胎次、懷孕增加體重、抽菸、喝酒、懷孕前生魚片攝取、懷孕期間服用營養補充劑、父親年齡、教育程度、抽菸與新生兒出生狀況呈顯著相關。複迴歸模式中顯示，母親懷孕前飲食習慣包括服用中藥、營養補充劑、魚類攝取會顯著影響新生兒胎便中的金屬濃度，尤其是鎘和汞濃度。父母親抽菸、喝酒、母親懷孕前血壓會顯著影響新生兒出生狀況，尤其是生產週數。其中胎便砷濃度對新生兒出生狀況有顯著地影響。

## 英文摘要

Background: Meconium is a matrix that can be obtained easily and noninvasively and is useful for detecting antenatal fetal exposure to environmental toxins. Despite the impressive growth of cross-border marriages and the increasing number of children born into these families in Taiwan, no studies have examined whether there are significant metals body burden differentials between babies of foreign-born and Taiwan-born mothers. Objectives: The objective of this study was to assess the metals concentration (lead, cadmium, mercury and arsenic) in meconium in relation to maternal and father's life-style, such as fish intake, occupation. Methods: A total of 258 mother-infant pairs (including 197 Taiwan-born mothers and 61 foreign-born mothers) residing in the city of Taipei were recruited for the study between August 2008 and March 2009. Meconium specimens were collected from 258 healthy newborn infants. The parents were interviewed face-to-face by a trained interviewer after delivery in which information pertaining to the parents' sociodemographic characteristics, occupation, pregnancy and reproductive history, fish intake, other lifestyle characteristics, and the baby's sex, gestational age, birth weight, head circumference and height at birth were collected. The entire meconium sample was lyophilized and 30 mg of the sample was transferred to a boat and activated alumina, sodium carbonate and calcium hydroxide were added. Mercury concentrations were determined by a mercury analysis system. Lead, cadmium, and arsenic were determined by ICP-MS. Results: The geometric mean concentrations of toxic metals (dry weight) in the meconium were as follows: the infants of Taiwan-born mothers Pb: 25.41± 88.76ppb, Cd: 6.60±5.29ppb, Hg: 79.80± 4.72ppb, and As: 43.05±7.13ppb, and the infants of foreign-born mothers Pb: 30.96±150.67ppb, Cd: 6.89±1.03ppb, Hg: 64.29±15.23ppb, and As: 46.10±3.30ppb. Meconium mercury concentration was significantly higher in those infants whose mothers were Taiwan-born. Mother's nationality, age, birth parity, drink, smoke, dental amalgam filled, eating raw fish and nutritional supplements can affect the status of newborn infants. A multiple regression model is shown that consuming traditional Chinese medicines, supplementation with vitamins, and fish intake in in pre-pregnancy may be affect the meconium metals concentrations, especially in cadmium and mercury. In our study demonstrated that the status of infant is strongly related to parental smoking, drinking, and maternal blood pressure, especially in gestational week.