A multi-center birth cohort study in Korea: MOthers and Children’s Environmental Health (MOCEH) study

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MOCEH means “Mother’s Body” in Korean.

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Introduction paper is on EJE 2009. See MOCEH poster booth!

Scope of research

- In Korea, the National Environmental Health Action Plan (NEHAP, 2006) outlines strategies for eliminating environmental health hazards and reducing their adverse effects on pregnant women and their children.

- In 2006, the Mothers and Children’s Environmental Health (MOCEH) study began as an initiative of the NEHAP.

Objectives

- To collect information on environmental exposure during pregnancy and childhood and

- examine the relationship between exposure to environmental pollutants and growth, development and disease in children.

- To provide scientific information for improvement of the health, development, and well-being of children in the future.
The cities of Cheonan and Asan are relatively clean and mixed area of rural and high tech industrial (mainly, informational technology and semiconductor industries) regions.

Seoul was selected for a study area due to large population size, heavy traffic volumes, serious air pollution and high density of apartments.

Ulsan, the largest industrial complex city in Korea, has various kinds of industries such as shipbuilders, car manufacturers, and petrochemical factories.

Study design

- The MOCEH study is a prospective hospital- and community-based cohort study
- Pregnant women, their partners, and their children will be the subjects of these investigations.

- The Institutional Review Board at Ewha Woman’s University, Seoul, South Korea has reviewed and approved the study protocol.
All aspects of the study design were finalized after taking the core hypotheses, financial resources, utility for future investigations, and ethics of the study into consideration.

Protocol development

- All aspects of the study design were finalized after taking the core hypotheses, financial resources, utility for future investigations, and ethics of the study into consideration.

Hypothesis of MOCEH

- Life course approach
  - Prenatal exposure (Prenatal)
  - In-utero
  - Environment (Postnatal)
  - Pregnancy outcome
  - Growth & development
  - Neurobehavior disorders
  - Environmental diseases

- Maternal exposure (Prenatal)
- Environment (Postnatal)
- Neurobehavior disorders
- Environmental diseases

Theory: the ‘developmental origins’

- Fetal gene expression
- Birth phenotype
- Childhood phenotype
- Adult phenotype
- Epigenetic change
- Disease Risk
- Parent’s characteristics

...The risks of a number of chronic diseases in adulthood such as insulin dependent diabetes mellitus, hypertension and coronary heart disease may have their origins before birth... - by Professor David Barker

Study process

- Stage 1: At Obstetrics
- Stage 2: At Delivery Room
- Stage 3: At Pediatrics

- Hypothesis of MOCEH
- Life course approach
- Protocol development
- Theory: the ‘developmental origins’
- Study process
**Numbers of subjects**

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**Possible evidences from MOCEH study**

- Air pollution and pregnancy outcomes
- Heavy metal and pregnancy outcomes and infant’s development
- PAH and oxidative stress and pregnancy outcomes
- Endocrine Disruptors and pregnancy outcomes and neurodevelopment

**Data collection**

- **Assessment of determinants**
  - Questionnaires
  - Measurements of environmental pollutants (Home visiting)
  - Biological samples
  - Dietary information
- **Assessment of outcomes**
  - Intrauterine growth
  - Birth outcomes
  - Growth and development
  - Neurocognitive development
  - Atopy, allergy, and asthma in children

**How to translate from study results to practice**

10 Guidelines list

- Environment Factor
- Nutrition
- Endocrine disruptors
- Heavy metals
- Air Pollution
- TVOC
- PM
- Lead
- Mercury
- Phthalate
- BPA
- Dietary Factor

- Health Effect
- Environmental Factor
- Pregnancy outcome
- Growth Development
- Neuro Development
- Birth outcomes
Data management and privacy protection

- We monitor the quality of the data periodically and conduct additional surveys to obtain information regarding questionnaire items that were left blank or insufficiently answered.

DB(Data Base) Structure

Future PERSPECTIVES

We expect that this study will

- provide new information obtained through academic research to support the hypothesis that the gestational environment affects the development of diseases during childhood and adulthood.

- establish of a national policy for improving the health of pregnant women and their children.

Acknowledgment

The MOCEH study team would like to engage in collaborative research and welcome future collaborative opportunities.

Access to the data is subject to restrictions outlined in the study protocols, and inquiries can be made to the study director or lead researchers with contact details listed on the study website (http://www.moceh.co.kr).

This study was supported by the Ministry of Environment, Republic of Korea.
Thank you very sweetly^^