ENVIRONMENTAL EXPOSURE AND RISK FOR MISCARRIAGE

SREEH FINAL PRESENTATION

Ava Fabian – Sacred Heart University
Dr. Zeyan Liew
MISCARRIAGE

- Miscarriage is defined as the death of a fetus before 20-24 gestational weeks.
- An estimated 10-15 out of 100 pregnancies end in miscarriage for women who know they are pregnant.
- Some women may miscarry before they know they are pregnant.
- Most miscarriages occur in the 1st trimester.

References:
- Center for Disease Control and Prevention (CDC), 2020
- March of Dimes, 2017

https://digitalcommons.sacredheart.edu/acadfest/2021/all/157
MISCARRIAGE AS A PUBLIC HEALTH CONCERN

- Miscarriage is a public health concern as it affects many women, their partners, and their families across the world.
- It may take weeks or months for the body to physically recover however, it can take years for emotional recovery to occur (March of Dimes, 2017).
  - Resources such as support groups and counseling are available to those who experience miscarriage.
  - There is often a stigma surrounding miscarriage so many women never seek or receive help.
- Environment may play a role in increasing the risk for miscarriage.
  - Reducing specific toxins, chemicals, and/or pollutants may decrease the risk of miscarriage.
RESEARCH METHOD

• PubMed was used to research the effects of environmental exposures on the risk for miscarriage

• An “umbrella review” approach was used
  • Review of the reviews
  • This method was used as it was the most efficient approach and an efficient way to research many topics

• Searched: “‘environment’ and ‘(miscarriage or fetal loss or pregnancy loss)’ review”

• Narrowed down findings to four main interests
  • Endocrine disrupters, incinerator emissions, indoor air pollution, occupational activity
ENDOCRINE DISRUPTERS

- Pregnancy occurs through a series complex endogenous hormonal interactions
- Environmental exposure to endocrine disrupting chemicals has the potential to interfere with endogenous hormone and chemical action (Kreig et al, 2016)
- Some endocrine disrupters studied in this review include Bisphenol A, dioxins, and phthalates
- This interference with normal chemical and hormonal processes can have adverse and even deleterious on the fetus
  - This is most likely to occur in early pregnancy when the hormonal environment after implantation is in especially delicate balance

INCINERATOR EMISSIONS

• Incineration is the burning of waste. This can release toxic chemicals and pollutants into the air
• Chemicals include polyadenylated hydrocarbons, benzenes, and dioxins
• 9 out of 11 studies found adverse effects including miscarriage, congenital anomalies, and infant death for those residing in close proximity to incineration plants (≤5 miles) (Tait et al, 2019)
• There is little public knowledge about incineration and the consequences it may have
  • “Public health practitioners can offer clearer advice about adverse health effects from incinerators.” (Tait et al, 2019)

Fabian: Environmental Exposure and Risk for Miscarriage

Air pollution is the presence of excessive or harmful substances within the air.

This systematic review focused on particulate matter, carbon monoxide, and cooking smoke all of which affect indoor air quality (Grippo et al, 2018).

Particulate matter exposure during the entire pregnancy has been found to increase miscarriage risk.

Carbon monoxide exposure during 1st trimester increases miscarriage risk.

Cooking smoke exposure during 1st trimester was found to increase stillbirth risk but not miscarriage risk.

OCCUPATIONAL ACTIVITY

• Strenuous activities: Long work hours, heavy lifting, standing

• Disruption of circadian rhythm: working nights, working long hours, not enough rest between shifts

• Working consistent nights was associated with an increased risk of miscarriage (Bonde et al, 2013)

• Working 3-shift schedules, 40-52 hours a week, lifting more than 100kg a day, standing 6-8 hours were found to be associated with small risk increments (Bonde et al, 2013)

• There are few studies on this, currently the findings do not provide strong enough evidence to implement mandatory restrictions for work

• Because there is limited evidence, it may be wise to advise women to avoid these exposures


FUTURE PLANS

• Choose one topic to research further
  • Occupational activity

• A more in-depth review of individual studies and possibly conduct meta-analysis on reported findings

• Manuscript for potential publication

• Racial disparities
  • Are there disparities in maternity leave availability? In hours worked? Amount paid and obligation to work more hours? Type of work? Etc.
Center for Disease Control and Prevention (CDC), 2020
March of Dimes, 2017
National Institute of Environmental Health Sciences (NIH), 2020
ACKNOWLEDGMENTS

• Mentor – Dr. Zeyan Liew
• Program Coordinators - Dr. Yong Zhu and Dr. Vasilis Vasiliou
• YSPH SRREH Program
• Funding – NIH