MATERNAL CHILDHOOD ADVERSITY AND INTERGENERATIONAL TRANSMISSION OF RISK DURING PREGNANCY: PRELIMINARY BIOMARKER RESULTS FROM HATCH PROJECT

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Background

Multiple studies show that higher adverse childhood experiences (ACEs) in mothers are linked to higher adverse birth outcomes. Adverse birth outcomes may operate as a pathway for intergenerational transmission of ACEs from mothers to their children. Oklahoma is in the lower bracket of the reproductive health-related rankings according to America's Health Rankings. To provide better understanding and health care to pregnant women and the children in Oklahoma, psychosocial and physiological data are critically needed to assess the risk of maternal ACEs and adverse birth outcomes. Therefore, the HATCH Project sought to fill the gap in our knowledge in maternal ACEs and pregnancy outcomes.

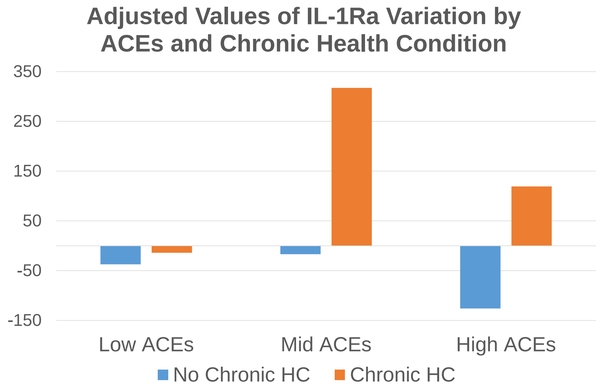
Methods

This study focused on the physiological pathway that links ACEs score and the levels of biomarkers indicating acute and chronic stress. Pregnant women were recruited from OU and OSU women's health clinics. ACE scores and biological samples were collected at the time of enrollment among 177 eligible participants. Participants' ACEs scores (0-10) were recoded into low (0-2 ACEs), mid (3-6 ACEs) and high (7-10 ACEs) groups. Salivary cortisol, serum C-reactive protein (C-RP) and interleukin-1 receptor antagonist (IL-1Ra) levels were measured as biomarkers for psychosocial stress and systemic inflammation. We calculated biomarker scores as variation from the expected value for time of day and gestation at collection. The values of the biomarker were adjusted by ACEs scores and chronic health condition (HC) in the final analysis. We also analyzed the duration of newborns spent in NICU with mothers' ACEs scores.

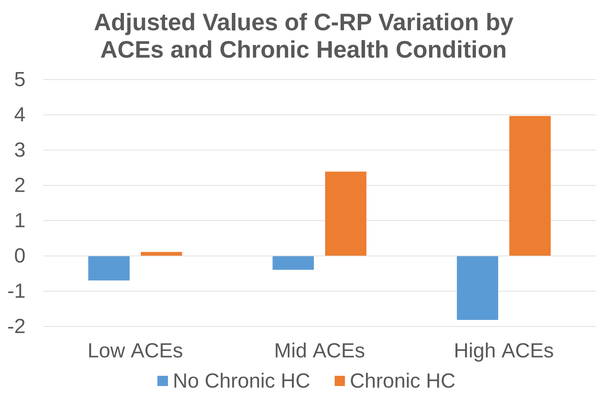
HATCH Component	N	Response Rate
Assessment 2- 2nd Trimester	147	86%
Assessment 3- Third Trimester	130	88%
Assessment 4- Short Post-Birth	125	96%
Assessment 5- 6 Week Post-Birth	123	99%
Assessment 6- 6 month Post-Birth	83	94%
Cortisol Lab Results	166	94%
CRP Lab Results	166	94%
IL-1Ra Lab Results	166	94%

Note: assessments 3-6 ongoing, response rate is calculated based on eligible participants

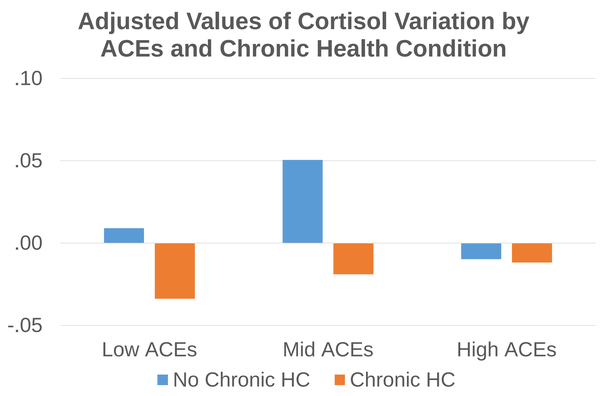
Results



Low ACEs group shows overall lower level of variation in IL-1Ra. IL-1Ra variation level is highest in the middle and high ACEs group with a chronic health condition. Women with higher levels of ACEs and a chronic health condition had higher than expected levels of inflammation.



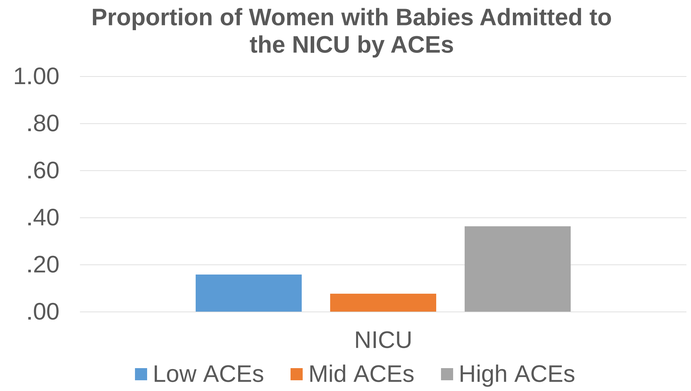
C-RP variation level is positively correlated to participants' ACEs scores among those pregnant women with a chronic health condition.



The low ACEs group shows overall low level of variation in cortisol. Cortisol variation level is highest in the mid ACEs group with no chronic health condition, indicating potential blunting responses.

Note: The moderate levels cortisol and IL-1Ra variation in the high ACEs group may represent the cumulative results of complex regulations after exposure to chronic stress.

Results



Women with high ACEs were at least twice as likely to have babies admitted to the NICU.

Conclusions

These results show the association between the maternal stress biomarkers with ACEs during pregnancy. We find that higher maternal ACEs are associated with more extreme variations in inflammatory biomarkers, particularly among pregnancy women with chronic health conditions. The results provide a useful framework for examining the risk of adverse childhood experiences, which potentially informs earlier and more efficient prevention and intervention in clinical settings.

Future studies

- Continue to follow HATCH participants through birth to better understand risks for subsequent pregnancy and developmental outcomes of infant.
- Submitting additional research proposals to build upon what we learned from HATCH.
- Continue to develop papers and proposals to disseminate findings.

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