A Pilot Study of Association of Adverse Childhood Experiences, Resilience, and DNA Methylation Profiling in Pediatric Irritable Bowel Syndrome

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**Background**

- Irritable bowel syndrome (IBS) is a brain-gut axis disorder characterized by abdominal pain and altered bowel habits. It is a multifactorial, stress-sensitive disorder with evidence for familial clustering attributed to genetic or shared environmental factors.
- Higher Adverse Childhood Experiences (ACE) have been reported in patients with chronic disease and the effects of ACE are likely from epigenetic programming. In pediatrics, parents/guardians report ACE.
- For children exposed to high ACE, a child’s perceived resilience may mitigate a negative health outcome or development of chronic disease.
- Epigenetic alterations including DNA methylation changes have been associated with several chronic diseases and can link gene-environment interactions to long-term behavioral development.

**Objectives**

- To compare ACE in pediatric IBS patients and healthy children.
- To assess the adolescent/teen’s ability to self-report ACE amongst other questionnaires.
- To compare parent/guardian reported and child-reported ACE.
- To compare genome-wide and selected IBS-associated genes’ methylation profiles in peripheral blood mononuclear cells (PBMCs).

**Aims**

- To compare ACE and resilience in pediatric patients with IBS and healthy children in order to determine their association with symptom severity and health outcomes.
- To assess whether adolescents/teens’ self-reported ACE scores are the same as the parent/guardian reported ACE scores for their child.
- To assess the precision of adolescents/teens’ abilities to complete their own health-related questionnaires.
- To compare genome-wide methylation profiles and methylation of selected IBS-associated genes in PBMCs in pediatric patients with IBS vs. healthy children and determine whether these differences in DNA methylation can be used in creating a diagnostic biomarker in pediatric patients with IBS.

**Methods**

- 12 patients with IBS (75% female, mean age = 16 years) and 12 healthy patients (50% female, mean age = 15 years). Recruited between July 2020 and December 2020 from our pediatric clinics.
- All subjects completed questionnaires—CASI-18 (anxiety sensitivity), GAD-7 (anxiety screener), PHQ-9 (depression screener), CDRISC-10 (resilience), PEARLS (ACE).
- IBS subjects additionally completed GI symptoms questionnaires: Rome IV IBS, PedsQL GI symptoms, and API.

**Results**

- Currently in data analysis phase

**Conclusions**

- Currently in data analysis phase

**Significance**

- While an association between ACE and IBS prevalence has been previously reported in adults, we believe the current study provides novel information regarding pediatric patients with IBS and ACE.
- Our data supports that ACE screening and intervention for prevention of pediatric IBS, and likely other childhood pain disorders, is needed even earlier than adolescence.
- In relation to ACE interventions, we must also focus on other methods than only increasing self-perceived resilience.
- ACE of Emotional Abuse significantly differentiated IBS and HC (58% in IBS vs. 8% in HC), consistent with adult data that shows a high correlation between abuse and IBS.
- We propose ACE screening of both pediatric patient and parent/guardian when possible as biases and external to household experiences can cause under-reporting of ACE.

**References**