Sleep Problems, Gastrointestinal Problems, and Anxiety: Which Comes First?

Center for Autism and Developmental Disabilities Research and Epidemiology
CADDRE

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Conflict of Interest

- **No Relevant Financial Relationships**

Learning Objectives

- Learners will become familiar with issues associated with sleep problems in children 2 to 5 years of age

Prevalence of Sleep Problems

- **ASD: 50-80%**
- **DD: 30-80%**
- **Typical Development:**
  - **1-5 years: 25-50%**
  - **School age: 10-12%**

SEED

CSHQ Total	ASD	DD	POP	ASD vs. DD	ASD vs. POP
>41	70.62%	62.76%	50.17%	OR=1.67, 95% CI= 1.15, 1.77*	OR= 2.38, 95% CI= 1.93, 2.96**
>47	50.23%	39.66%	27.29%	OR=1.54, 95% CI= 1.25, 1.88**	OR= 2.69, 95% CI= 2.17, 3.34**

* p=0.0012, ** p<0.0001

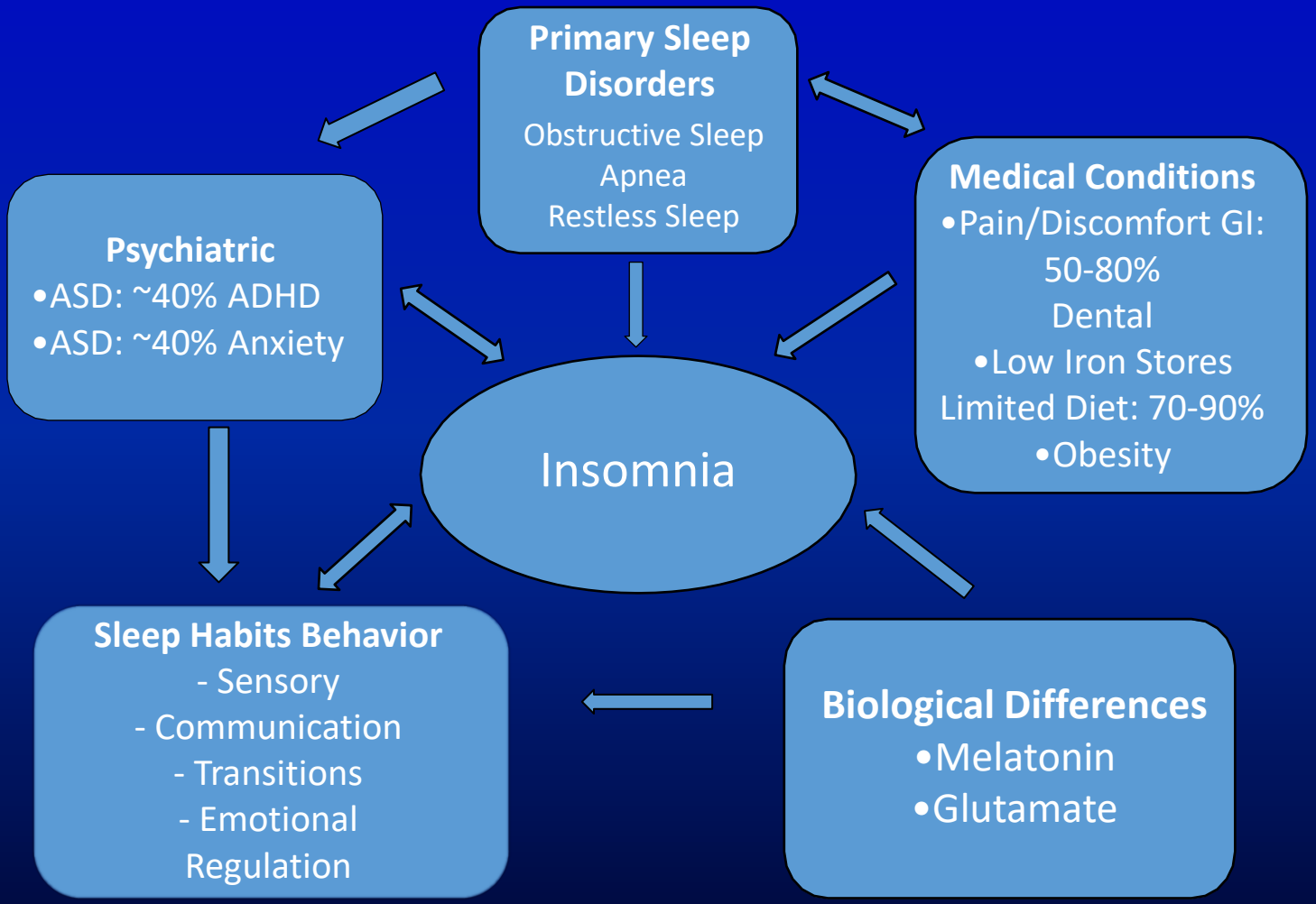
Behavioral Impact of Poor Sleep

- All Children
  - Decreased Attention
  - Irritability
- Children with Autism
  - Self injury
  - Repetitive Behaviors
  - Aggression
- Parents of Children with Autism
  - Greater Stress

Physical Impact of Poor Sleep

- Neural Plasticity (Picchioni 2014)
- Memory Consolidation
- Obesity (Hill 2015, Dreyer 2015)
- Cardio-metabolic (Quist 2015)
  - Cortisol
  - Insulin resistance
  - Sympathetic tone
- Immune Function (Careaga, 2015)

Sleep is Complex



Methods

- Sleep as Outcome (n=1987)
  - Children's Sleep Habits Questionnaire
- Analysis: Multiple Logistic Regression
  - Model 1: adjust for sociodemographic variables: age, sex, race, family income, caregiver education
  - Model 2: adjust for sociodemographic & study group
  - Model 3: adjust for all covariates: sociodemographic, group, cognitive(MSEL), anxiety (CBCL), social (SRS), neurological/genetic, GI, BMI

Methods

- Behavior as Outcome in children with Sleep Problems
  - Child Behavior Checklist (CBCL):
    - internalizing and externalizing domains
    - empirically derived syndrome scale scores: anxious/depressed, attention problems, emotionally reactive, and aggressive behavior
- Analysis:
  - MANOVA models assessed associations between elevated sleep scores and elevated behavior scores

Results

- After adjusting for all co-occurring conditions, the following were associated with sleep problems:
  - GI 1.6 times more likely to have sleep problems

    [aOR (95% CI) 1.61 (1.20, 2.17)]
  - Anxiety/depression 4.42 times more likely to have sleep problems
    [aOR (95% CI) 4.42 (2.08, 8.65)]
- Sleep problems associated with increase in CBCL t-score:
  - Internalizing behavior by 6.9 points
  - Externalizing behavior by 7.1 points
-

Conclusions

- When evaluating sleep problems in young children, gastrointestinal and anxiety/depression symptoms should be considered.

Next Steps

- Genetics

Thank You

FAMILIES

SEED STAFF/COLLABORATORS

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Questions?