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Outcomes of Children Prenatally Exposed to Opioids Around the World: A Systematic Review

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Purpose: Opioid addiction is a growing global public health concern. While the United States still consumes a majority of the global opioid supply, consumption in other countries is on the rise (International Narcotics Control Board, 2018). Opioid use and abuse has had far-reaching and sometimes unexpected consequences, such as increasing incidence of infectious disease, escalating violence in Mexico, and lower participation in labor markets amongst men (Hoban, 2017). Children especially have been the silent victims of the opioid epidemic. In the United States, roughly 75% of states have seen unprecedented numbers of children entering the foster care system with parental substance abuse cited as the primary reason (United States Department of Health and Human Services, 2017). In Ohio alone, there has been a 712% increase in the numbers of infants prenatally exposed to opioids and other substances between 2006 and 2015 (Ohio Department of Health, 2015). Currently, it is unclear how prenatal opioid exposure effects development throughout childhood. This is important to determine given the sheer number of children who have been exposed, primarily in North America and increasingly in Europe. By identifying areas of development most effected by exposure, interventions can be developed to improve those specific areas. The purpose of this systematic review was to synthesize studies of the long-term developmental outcomes for children prenatally exposed to opioids compared with children who were not exposed.

Methods: This systematic review was reported according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (Moher, Liberati, Tetzlaff, Altman, The PRISMA Group, 2009). PubMed, EBSCO HOST/Medline, Web of Science, and reference lists were used to identify studies. Included studies were original research published in English that addressed outcomes of children, aged 2 years and older, who were prenatally exposed to opioids. Four independent reviewers extracted data and assessed study quality using NIH Quality Assessment Tools. The synthesis of data was only qualitative. A meta-analysis was not performed because the primary purpose of this review was to identify a wide range of developmental outcomes secondary to prenatal opioid exposure, which is not conducive to quantitative analysis.

Results: Fifty-nine studies (5 randomized trials, 49 observational studies, and 5 retrospective cohort studies) examining 11 categories of outcomes were found. Study quality was good for 5 studies, fair for 40 studies, and poor for 14 studies. Many studies reported differences in outcomes between exposed and non-exposed children, however outcomes varied widely, and some exposed children’s outcomes were no longer significant after controlling for other variables (such as perinatal outcomes, maternal education, or socioeconomic status). Most frequent differences between groups were found in outcomes of academic success, attention/ADHD measures, behavior, vision, and hospital admissions/morbidity. In all outcome categories with significant differences between groups, children prenatally exposed to opioids had worse outcomes than non-exposed children. When outcomes were categorized by age, an interesting pattern emerged. More significant differences were seen between groups as participants aged; so by

adolescence, there were significant differences between groups on most outcomes. When outcomes were assessed by country of study origin, there were no differences found.

Conclusion: Results from this systematic review suggest there are differences in multiple developmental outcomes between children prenatally exposed to opioids and non-exposed children. However, there remain questions about how much of the outcome can be attributed to environment or to prenatal opioid exposure. Some of the limitations of this study were the heterogeneous nature of the outcome measures and the quality of included studies. Going forward, future research should focus on development and implementation of interventions and policies that facilitate improved outcomes, especially in areas of most need. This research also has implications for nursing practice. As nurses, we have a responsibility to health promotion and disease prevention. Developmental problems arising from adversity during the prenatal period and early childhood increase the likelihood of difficulty with mental and physical health across the lifespan (National Scientific Council on the Developing Child, 2014). It is important to be aware of children who have been prenatally exposed to opioids and the potential developmental effects so that nurses can intervene as early in the developmental trajectory as possible. While developmental effects may not be readily apparent during early childhood, it will be important to assess for developmental issues as the children grow.

Title:

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Keywords:

Children, Development and Opioids

References:

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Abstract Summary:

Illicit use of opioids is becoming a global health concern, especially amongst users of childbearing age. In this session, long-term developmental outcomes of children around the world prenatally exposed to opioids will be discussed, as well as implications for future research and nursing practice.

Content Outline:

Introduction: Opioid abuse is increasingly becoming a public health concern around the world. What used to be considered an issue for North America is quickly spreading to other developed countries.
Example 1: Global opioid consumption statistic from painpolicy.wisc.edu
Example 2: Global opioid consumption statistic #2 from painpolicy.wisc.edu
Many of the opioid users are of childbearing age, leading to grave concern for the outcomes of the prenatally opioid exposed children.

It is unclear how prenatal exposure to opioids effects children across the lifespan. This is important to determine given the sheer number of children exposed prenatally to opioids.
By identifying areas of development most effected by prenatal opioid exposure, interventions can be developed to improve those specific areas.
The objective of this study was to determine long-term developmental outcomes for children prenatally exposed to opioids compared with children who were not prenatally exposed to opioids.

Body
Main Point 1: Study Methods: This systematic review will be reported according to the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA).
Discussion Point 1: Eligibility Criteria
Discussion Point 2: Search Term Combinations
Discussion Point 3: Study Assessment

Main Point 2: Study Results
Discussion Point 1: Characteristics of included studies (Design, sample size, year of publication)
Discussion Point 2: Demographics of included study participants
Discussion Point 3: Results based on country of study origin (Australia, Denmark, Finland, Israel, Germany, Netherland, New Zealand, Norway, Sweden, UK, USA)
Discussion Point 4: Results based on outcomes measured (Academic success, Attention/ADHD, Behavior, Cognitive development, Executive function, Vision, Hospital admissions, Morbidity/Mortality, Imaging, Neurologic Outcomes, Physical Development, and Social-Emotional outcomes).

Main Point 3: Discussion

Discussion Point 1: Global Implications: Similarities and Differences in Findings
Discussion Point 2: Limitations of Study

Conclusion
Example 1: Implications for Future Research (further knowledge of causal mechanisms of outcomes)
Example 2: Implications for Nursing Practice (Awareness of scope of problem, Call to action to take part in creating culturally-sensitive interventions and environments where these children can overcome barriers to development resulting from exposure to opioids and substance abuse environments).

First Primary Presenting Author

Primary Presenting Author

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Author Summary: Dr. Sara Arter is an Assistant Professor at the University of Cincinnati, College of Nursing and a Robert Wood Johnson Foundation Future of Nursing Scholar. Her research focuses on the longitudinal outcomes of children prenatally exposed to opioids and targeted interventions to promote future success. She currently collaborates with fellow researchers in medicine, anthropology, developmental psychology, and school psychology.

Second Author

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Author Summary: Dr. Brian Tyler is a postdoctoral fellow at Miami University, Oxford Ohio, and a medical anthropologist specializing in conflict, refugee displacement, global health inequities, and the opioid epidemic.

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Author Summary: Dr. Cameron Hay is a cultural anthropologist and chair of the Anthropology Department at Miami University of Oxford, Ohio. She is interested in how people understand, experience

and cope with illness and disease, whether as patients, family members, health care providers, or simply normal people for whom managing health is a part of daily life.

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Author Summary: Dr. McAllister is a pediatrician with the Perinatal Institute since 2013. She is the co-medical director of the Neonatal Abstinence Clinic (NAS), and her research investigates the short and long term outcomes of babies diagnosed with NAS. She is interested in standardizing and optimizing care for newborns with NAS both inpatient and upon discharge from the hospital. Additionally she is involved in resident education and has helped develop the newborn resident education curriculum.

Fifth Author

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Author Summary: Dr. Kiel's research focuses on understanding the etiology of childhood anxiety disorders within a developmental psychopathology framework. Her work has aimed to clarify how early fearful/inhibited temperament predicts risk for anxiety-spectrum problems, with a particular focus on emotion processes (awareness, reactivity, regulation) involved in transactional influences occurring between anxiety-prone children and their parents.