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EXAMINING THE INTERACTION OF ADVERSE CHILDHOOD EVENTS,
DENTAL ISSUES, ASTHMA AND AUTISM

A Dissertation

Submitted to the School of Nursing

Duquesne University

In partial fulfillment of the requirements for
the degree of Doctor of Philosophy

By

Cathy Koetting

December 2021

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Cathy Koetting

2021

EXAMINING THE INTERACTION OF ADVERSE CHILDHOOD EVENTS, DENTAL
ISSUES, ASTHMA AND AUTISM

By

Cathy Koetting

Approved October 12, 2021

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ABSTRACT

EXAMINING THE INTERACTION OF ADVERSE CHILDHOOD EVENTS, DENTAL ISSUES, ASTHMA AND AUTISM

By

Cathy Koetting

December 2021

Dissertation supervised by Dr. Rebecca Kronk

Purpose: Adverse childhood events (ACEs) have a profound and long-term effect on the health outcomes of many children and adults. However, few studies have focused on specific ACEs and health outcomes in children with autism spectrum disorder (ASD). The aim of the study was to investigate if ASD moderated the relationship between ACEs and specific health outcomes in children who had been the subject of a child welfare system report.

Design and Methods: Using the second National Survey of Child and Adolescent Well-Being (NSCAW II), a secondary analysis was performed on a sample of 80 children with diagnosed autism and 5,698 children without autism. ACEs score criteria included physical abuse, sexual abuse, neglect, psychological aggression, domestic violence, parental substance abuse and mental health. Health outcome variables included dental issues and asthma. Child characteristics of age, gender, race and poverty level were also included in the analysis.

Results: Chi-square analysis indicated a significantly higher percentage of children with ASD whose parents reported psychological abuse compared to children without autism χ^2 (28.03, $df = 74$, $F = 11.08$). Children with ASD have a noteworthy number of ACEs compared to children without autism ($p = 0.00$). Logistic regression found having an ACE increased the odds of having dental issues 2.80 times compared to not having an ACE (odds ratio [OR] = 2.8, standard error [SE] = 1.27, $p < 0.5$).

Conclusions: A diagnosis of ASD does not appear to moderate dental issues or asthma in this sample of children. Children with ASD are at risk of harmful and chronic health outcomes due to ACEs.

Practice Implications: All healthcare providers should include ACE screening when assessing children with ASD. If completed early and regularly, preventative measures may be employed that help support families and may avoid entrance into the child welfare system.

DEDICATION

I would like to dedicate this dissertation to my three children, most particularly my two children with autism who have been my inspiration for my nursing research. Being their parent has not only been challenging but rewarding in many ways and my research interest in this area stemmed from my role as their mom, nurse practitioner, and advocate. I would also like to sincerely thank Dr. Kronk, my committee chair who supported me through the entire process, along with the rest of my committee Dr. James Schreiber, Dr. Jesse Helton and Dr. Karen Neil for their invaluable support and feedback.

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I would like to acknowledge the assistance I received from Dr. Jesse Helton, my database expert who guided me through the statistical analysis of this dissertation. Without his expert support and encouragement, this dissertation would not have been possible.

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Specific Aims

Adverse childhood experiences (ACEs) such as physical and sexual abuse, neglect, family mental illness, substance abuse, and interpersonal violence create cumulative environmental adversity that can result in poor health outcomes by adulthood (Dube & Cook, 2010; Felitti & Anda, 2002; Felitti & Anda, 1998). These poor health outcomes are a part of the spectrum of population health outcomes, defined as “ the health outcomes of a group of individuals, including the distribution of such outcomes within the group (Kindig & Stoddart, 2003, p. 380). When looking at the population health outcomes of children who experienced ACEs, children with cognitive disabilities have an increased rate of abuse along with poorer health outcomes compared to their peers without disability (Emerson & Hatton, 2007; Emerson & Spencer, 2015; Maclean et al., 2017). Hence, for children with cognitive disabilities, ACEs may contribute toward the development of poorer population health outcomes such as chronic dental problems.

Two studies concluded that children with ASD have an increased probability of exposure to a higher total number of ACEs (Berg, et al., 2017; Kerns, et al., 2017). Another related study found that in children with ASD, the presence of ACEs increased the length of time to diagnosis of ASD and subsequent receipt of services (Berg, Acharya, Shiu, & Msall, 2018). The American Academy of Pediatrics (AAP) believes that screening in the primary care setting must address health disparities associated with maltreatment (Shonkoff & Garner, 2012). In 2014, the AAP published a toolkit for pediatricians to use in the primary care setting for screening children and youth with special health care needs for ACEs and addressing trauma (AAP, 2014). However, Kerker and colleagues (2016) found that while pediatricians understand the importance of screening children with special health needs (including ASD and DS) for ACEs, that in fact,

most providers neglect to screen in practice due to lack of education. Therefore, primary care providers may be ignoring a trauma related response in children with ASD and DS which can negatively impact their health outcomes as compared to peers without disability. Research studies from Great Britain evidence that people with intellectual disabilities have significantly higher mortality rates than those without intellectual disabilities. Their life expectancy at birth was 19.7 years lower than for people without intellectual disabilities with respiratory, circulatory and neoplasms as the three most common causes of death (Glover, Williams, Heslop, Oyinlola, & Grey, 2017). In the United States, using select state disability systems and medical claims data, researchers calculated average age at death and crude mortality rates and found that average age at death was 50.4 – 58.7 years and 61.2 – 63 years in Medicaid data. Results also found that age at death was lower, while mortality rates are higher in people with intellectual disabilities (Lauer & McCallion, 2015).

A systematic review of 27 articles regarding mortality and cause of death in individuals with intellectual disabilities found that leading causes of death for this population include cerebrovascular disease, ischemic heart disease, and cardiac failure (O'Leary, Cooper, & Hughes-McCormack, 2018). Using the 1995 National Health Interview Survey – Disability Supplement linked to the National Death Index Records from 1994 – 2006, researchers found that the leading cause of death for individuals with disabilities was heart disease (Forman-Hoffman et al., 2015). According to the American Academy of Periodontology, several studies have shown that periodontal disease increases the risk of heart disease, citing that this type of disease causes inflammation that can lead to heart disease risk. Additionally, the American Academy of Periodontology also cites additional studies showing a relationship between periodontal disease and stroke noting that patients diagnosed with acute cerebrovascular

ischemia were more likely to have an oral infection (American Academy of Periodontology, 2019). As heart disease and stroke are significant causes of preventable death in the world, looking at this possible association between children with cognitive disabilities, ACEs, and dental health is important as it appears there are population health outcomes in this vulnerable population that can be addressed in a comprehensive approach to care. Moreover, despite a well-documented association between ACEs and poor health outcomes, the impact of ACEs on dental health in children with ASD or DS has not been explored. By examining this interplay, we may be able to improve screening for ACEs in this population.

The proposed study is a cross-sectional secondary data analysis of the National Survey of Child and Adolescent Well Being (NSCAW II) (Barth et al., 2002). The NSCAW II is a national probability survey of 5,873 children between the ages of zero and 17.5 years from 83 counties across the United States who encountered the welfare system as a subject of a child maltreatment report. The study sample derived from this national database will include children ages five years through 16 years. The comparison sample group will include children ages five years through 16 years who have a documented cognitive disability (ASD and DS), documented history of ACEs, and identified dental health, asthma and obesity issues. The rationale for this age range is the presence of either ASD or DS would be diagnosed by ages five years through 16 years, dental, asthma and obesity issues identified, and includes the 12 year to 15 year age range of children with intellectual disabilities known to have the highest rate of violent victimization according to the US Bureau of Justice Statistics (Harrell, 2017).

This proposed study aims to answer the following research questions:

1. Do children with cognitive disabilities such as ASD or DS ages five through 16 years who have been a subject of a Child Welfare System maltreatment report, have higher ACE

scores compared to ACE scores of children without ASD or DS ages five through 16 years who have been a subject of a Child Welfare System report?

2. Do children with ASD or DS, ages five years to 16 years who have a documented history of exposure to ACEs, have an increased rate of dental issues compared to children without cognitive disabilities, ages five years to 16 years, who also have a documented history of exposure to ACEs?

This study will contribute to the investigation of the impact of ACE history in children diagnosed with DS or ASD and the influence on health outcomes. There were no original studies found in a comprehensive review of this topic area yet 1 in 59 children are diagnosed with ASD and 1 in 700 children diagnosed with DS in the US each year (Baio, Wiggins, & Christensen, 2018; Parker et al., 2010). Results of the proposed study will contribute to better screening and improved health outcomes in children with ASD or DS and provide a foundation for further research in the area.

Significance

Description of the Population at Risk

In the United States, statistics show the prevalence of intellectual disabilities at one to one and one-half of the total population (McKenzie, Milton, Smith, & Ouellette-Kuntz, 2016). According to the Centers for Disease Control and Prevention (CDC), the prevalence of children ages three to seven years with diagnosed intellectual disability was 0.73%; among children ages eight to twelve was 1.45%; and among children, ages 13 to 17 years was 1.40% from 2014 – 2016 (Zablotsky, Black, & Blumberg, 2017). According to the Diagnostic and Statistical Manual 5th Edition (DSM V), children with cognitive disabilities are included in the umbrella diagnosis of intellectual disability (American Psychological Association, 2013). Because the definition of

intellectual disabilities in the DSM V is broad, children with cognitive disabilities are a specific sub-group in which cognitive impairment is the most profound symptom. Typical diagnoses include ASD and DS.

A recent report from the Henry J. Kaiser Family Foundation found that annual per enrollee spending is over seven times higher for Medicaid children who qualify through a disability pathway compared to those who qualify through another pathway such as family income (Musumeci & Foutz, 2018). This picture represents a substantial population of children at risk for poor outcomes with the presence of ACEs. It also represents a large number of taxpayer monies spent on children that are not reaping the most benefit from this spending as this population has poorer health outcomes than their non-disabled peers.

The Effect of ACEs on a Population's Health

Research undertaken in the general population shows that exposure to ACEs has a detrimental impact on health and well-being across the life course (Felitti & Anda, 1998). ACEs include types of child maltreatment such as physical, sexual, emotional abuse, physical neglect, neglect along with life events such as having an incarcerated household member, divorced parents, presence of interpersonal violence in the home, a parent abusing drugs or alcohol, and co-morbid mental health issues themselves or a parent with mental health issues. One or more ACEs create a type of cumulative environmental adversity mediating biological, social and psychological pathways through which these adversities impair health (Chartier & Walker, 2010; Dube & Cook, 2010; E. Emerson, 2012; Felitti, 2002).

Unfortunately, children with cognitive disabilities also have higher rates of exposure to ACEs. Secondary data analysis of the 2011/2012 version of the National Survey of Children's Health (Maternal Child Health Bureau US Department of Health and Human Services, 2011) by

Berg and colleagues (2016) used a logistic regression model and found that children with ASD were at a significantly higher risk of four or more ACEs in comparison with typically developing peers. Factors such as child age, the severity of ASD level, the status of parental health and education level along with living at the US federal poverty level were independently associated with high ACEs, and were nearly identical to those factors that predicted moderate ACEs (Berg, et al., 2016).

Additionally using the same database, Kerns and colleagues (2017) found in families with low socioeconomic position (SEP) and children with cognitive disabilities, there was a higher chance of having two or more ACEs. For children with cognitive disabilities, specific ACEs such as having a parent with a mental health diagnosis or having a parent who has a history of problems with law enforcement or incarceration, can lay the groundwork for an increased risk of harm that affects their overall health outcomes (Emerson & Brigham, 2015; Hornor & Fischer, 2016).

Increased risk of becoming victims of abuse. Children with cognitive disabilities are a more vulnerable population to becoming victims of abuse and neglect. A report from the Bureau of Justice showed that among individuals with disabilities, persons aged 12 – 15 had the highest rates of violent victimization (Harrell, 2017). Research regarding the abuse of children with cognitive disabilities, particularly those with behavior issues, found is a three times higher risk factor of being abused than their peers without disability (Sullivan, 2009; Sullivan & Knutson, 1998). Children with cognitive disabilities such as ASD and DS were found to have an increased risk of alleged and substantiated abuse compared to their peers without these diagnoses (Maclean et al., 2017). A narrative review by Wissink and colleagues (2015), substantiated that children with intellectual disabilities have two to ten times increased the rate of sexual abuse.

Additionally, a recent study found that children with ASD were two to three times more likely to experience maltreatment (consisting of all forms of abuse) (McDonnell et al., 2018). Hence, the literature contains substantial evidence to show that children with cognitive disabilities are not only more vulnerable to becoming victims of abuse and neglect but become victims at a higher rate than their peers without cognitive disabilities.

ACEs, health, and disability. Many children with cognitive disabilities have co-morbid mental health issues that contribute to poorer health outcomes than peers without cognitive disabilities. Hatton and Emerson (2004) performed a secondary data analysis using data from the Office for National Statistics of Great Britain examining the presence of psychopathology in children with intellectual disabilities. Findings indicated that children with intellectual disabilities not only had an increased prevalence of diagnosed psychiatric disorders but they also experience more ACEs related to parental difficulties, along with low SEP. Kerns and colleagues (2017a) found children with ASD had increased rates of anxiety, depression and behavioral problems compared to peers without ASD.

Additionally, using the National Survey of Children's Health researchers identified other significant co-morbid physical diagnoses such as poor oral health. In a national study by Kopycka-Kedzierawski (2008), parents of children with autism were more likely to report their children as having poor or fair dentition than parents of children without autism. Specifically, while children with ASD can have an increased risk of dental caries due to inability to tolerate tooth brushing and dental examinations as a result of behavioral or sensorial difficulties, this population is at risk for many other dental issues. Bruxism or teeth grinding, non-nutritive chewing, tongue thrusting, self-injury, erosion, xerostomia or dry mouth mainly due to antipsychotic medications along with a hyper gag reflex all contribute to an increased rate of

periodontal disease (Loo, Graham, & Hughes, 2008; University of Washington and Washington State Oral Health Program, 2010). For children with DS, periodontal disease is the most significant oral health problem resulting from contributing factors of poor oral hygiene due to sensory issues, malocclusion, conical-shaped tooth roots, and abnormal host response due to a compromised immune system (US Department of Health and Human Services, 2009).

According to the Surgeon General's report, a physical exam of the mouth and face can reveal signs of disease, drug use, domestic physical abuse, harmful habits, and general health status. Lesions of the oral mucosa may signal signs of viral, bacterial, or other dermatologic diseases. Recent studies have also reported associations between periodontal infections and diabetes, heart disease, stroke, and adverse pregnancy outcomes (US Department of Health and Human Services, 2000). Hence focusing on oral health issues is a natural segue to the possible identification of chronic illness in children with cognitive disabilities who experienced ACEs.

Using the National Children's Health Survey, 2011/2012 researchers found that the prevalence of unmet dental, vision, and mental health care needs were significantly lower in children without ACEs versus those with one or more ACEs (Berg, Shiu, Feinstein, Msall & Acharya, 2018). Additionally, children with ASD who experienced up to three or more ACEs were associated with 1.78 times the incident rate of unmet healthcare needs compared to children without ACEs (Berg, et al., 2016). Overall, research shows that children with cognitive disabilities experience further ACEs than their non-disabled peers, and they have poorer mental health and physical health outcomes such as periodontal disease which can lead to heart disease and stroke. These multidimensional factors of cognitive disabilities and ACEs are all believed to potentially lay the foundation for poor health outcomes in this population.

Bronfenbrenner's Ecological Systems Theory as the Guiding Framework

Current research suggests that the increased incidence of ACEs leading to poor population health in children with cognitive disabilities is multifaceted. An approach that incorporates factors of socioeconomic position of families with children with cognitive disabilities and social determinants of health, those environmental conditions that affect the range of healthy functioning, quality of life, risks and familial factors can enhance the nursing discipline understanding of this complicated relationship. An ecological systems framework helps to clarify the interplay between ACEs and population health because it focuses on family structure and functioning, child and parent characteristics, and community influences.

Bronfenbrenner's (1979) Ecological Systems Theory is the theoretical framework from which to view the relationship of children with cognitive disabilities with ACEs and population health. The theory purports the environment of the child as an interactive set of systems nested within one another (Bronfenbrenner, 1979). The dominant dynamic shaping the context in which an individual directly experiences social reality is the interdependent interactions of social systems (Bronfenbrenner, 1979). The child with cognitive disabilities is an inseparable part of a social network composed of the micro-, meso-, exo-, and macrosystem. Emphasis is on consideration of the cultural, political, environmental, economic, and demographic factors in shaping family dynamics.

The microsystem contains the child's interpersonal relationship with others in the immediate setting. Microsystem factors relevant to children and ACEs include parent-child relationships, co-morbid mental health problems, substance abuse, and interpersonal violence in the home. The microsystem is made of the groups that have direct contact with the child such as family, school, and church. The mesosystem is the interconnection between the microsystems, is made up of groups from the microsystem and consists of relationships within the family (child

and peer) and family relationships with school, church, and other outside communities. Presence of cognitive disability is the most significant factor exerting influence in the mesosystem for this population. The mesosystem straddles or mediates the relationship between the child with a cognitive disability and all other relationships in the socio-ecological system.

Lastly, the mesosystem consists of the micro-, exo-, mesosystems that are a part of family culture, specifically, social and psychological features of culture which can influence conditions and processes at the microsystem level. Culturally and socially defined role expectations influence parenting processes and developmental outcomes. Attitudes and beliefs regarding parenting practice, cognitive disabilities, abuse and interpersonal, and community violence shed light on understanding factors for child maltreatment and ultimately, health outcomes.

The exosystem consists of interactions or links between two or more settings, and they influence the child indirectly. A parent's employment (or lack of), social support network, neighborhood characteristics, and relations between school and community comprise many of these factors. Exosystem factors include ACEs such as neighborhood violence, incarceration of a family member, or involvement with law enforcement, and single-parent households lacking social support systems leading to income insufficiency and increasing parental stress. The focus of the proposed study is on the relationships of the microsystem interacting within the mesosystem, specifically children with ASD or DS and children without ASD or DS who have been the subject of a child maltreatment report.

Knowledge Gaps Regarding the Effects of ACEs on Children With Cognitive Disabilities

There is a paucity of literature, particularly in the nursing discipline regarding the effects of ACEs on children with cognitive disabilities. This gap is essential, considering the role nurses

play in the treatment of children in healthcare delivery. Treatment of children with cognitive disabilities occurs in all healthcare delivery systems; hence, nurses should be knowledgeable about their care.

Additionally, because children with cognitive disabilities are abused more frequently than their peers without disability, it is essential for all healthcare providers, to understand how ACEs, may cause health risks and possibly alter health outcomes. Specifically, forensic nurses who care for abused children with cognitive disabilities must be able to screen for other possible sequelae of violence, such as poor dental health and co-morbid mental health issues. Alterations in the long-term physical health of children with cognitive disabilities due to violence cause concern, particularly in light of the knowledge that this population has poorer population health. Although physical and mental health issues are the result of ACEs in the general population, there is a gap in research addressing the difference in populations and the effect of ACEs. Not addressed in the medical or nursing literature is the question, does cognitive disability in the presence of ACEs including child maltreatment, create a relationship that places these children at risk for poorer health outcomes than their peers without a disability? This prospective study is designed to focus on population health outcomes of dental issues when exposed to ACEs and seeks to find a possible answer to the question of how cognitive disabilities may affect this relationship.

Importance of the Proposed Research to Health and Nursing

Research regarding the role of ACEs among children with cognitive disabilities points to a need to recognize their vulnerability toward poor health outcomes (Berg et al., 2018; Emerson & Brigham, 2014; Hatton & Emerson, 2004; Kerns, Newschaffer, Berkowitz, & Lee, 2017b). This vulnerability leads to increased morbidity and mortality (Glover et al., 2017; Lauer & McCallion, 2015). Additionally, this vulnerability translates into enormous costs for healthcare

systems, public health funding resources, and individuals, and results in a substantial public health burden. Both third-party payers and families of children with cognitive disabilities experience substantial health care related expenses particularly between the ages of birth and 18 years (Genereaux, van Karnebeck, & Birch, 2015; Kageleiry et al., 2017). Public health programs such as Medicaid, funded by public tax dollars pay for a large amount of the chronic health care costs of this population. Additionally, while screening programs for ACEs in the primary care setting exist, studies show poor pediatrician compliance with actual screening and education for families of children with special health care needs, a group which includes children with cognitive disabilities (Kerker et al., 2016).

For those caring for this vulnerable population, education regarding how cognitive disabilities may affect population health outcomes in the presence of ACEs is necessary. Because nurses are the largest single profession of healthcare providers in the US (American Association of Colleges of Nursing, 2019), and taxpayer-funded programs spend substantial monies treating health care needs of children with cognitive disabilities, education of nurses regarding these healthcare needs would result in possible taxpayer savings. Increasing the amount of nursing research regarding how cognitive disabilities may affect health outcomes regarding ACEs may lead to the development of more appropriate screening tools for use in this population, and more importantly, may help to develop prevention programs targeting this population that can produce positive outcomes efficiently and effectively. Specifically, since forensic nurses may treat children with cognitive disabilities who have experienced child abuse and may have higher ACEs scores than children without cognitive disabilities, increased nursing research knowledge regarding screening and education in this population may help to decrease poor population health outcomes.

Innovation

The proposed study is innovative for the following reasons: First, the exploration of the relationship between cognitive disabilities (i.e. ASD and DS), ACEs, and dental health is new knowledge for the nursing discipline. Although nurses are the largest single healthcare provider for the population of children with cognitive disabilities, literature searches consistently find an absence of nurse researchers publishing studies about children with cognitive disabilities, ACEs and population health outcomes. As a result of this gap, social workers and psychologists are guiding healthcare interventions for this population. Nurses are alarmingly and notably absent in research involving this population. Research of this topic shows nursing acknowledgment of a vital healthcare topic in a population that needs improved healthcare.

Second, the research will be a secondary data analysis using data from the second National Survey of Child and Adolescent Welfare (NSCAW II) (Dowd et al., 2013). Child welfare, social work, psychology have published over 15,000 studies from this data set in the past four years, yet not one study from the nursing discipline using this database exists (National Data Archive on Child Abuse and Neglect, 2019). Although the use of secondary data analysis methodology is not new to nursing, this database as a novel and rich source of information regarding cognitive disabilities and presence of ACEs in children, may lead to a better understanding of how this constellation of factors impacts population health.

Third, the ACEs are hidden markers when looking for causes of early mortality in this population. If Medicaid spending is seven times higher for children who qualify through a disability pathway, but mortality is still worse, then the investment in healthcare for this population is not being realized. Research geared toward understanding how cognitive disabilities and ACEs affect population health, may also lead to a better quality of life for this

population and decrease mortality. Innovative forensic nursing research can lead to use of life saving assessment tools in nursing practice: as an example in domestic violence victims, traumatic brain injuries and non-fatal strangulation sustained during domestic violence victimization can lead to early death in this population (Patch, Anderson, & Campbell, 2018). Nurses have learned through evidence based practice that screening and early recognition of strangulation or history of in domestic violence can save lives and prevent morbidity in this population. Similarly, this proposed study is being completed to increase knowledge regarding ACE history and health in this population (children with ASD or DS) with a factors which could contribute to early death without screening and prevention.

Approach

Database Overview

The proposed study will be a secondary data analysis using data from a cross-sectional, longitudinal survey, the Second National Survey of Child and Adolescent Well-Being (NSCAW II). The NSCAW II was designed to answer fundamental questions about the performance, service needs and service use of children who encountered the child welfare system due to an abuse allegation (Helton, Gochez-Kerr, & Gruber, , 2017). It is sponsored by the Office of Planning, Research, and Evaluation, Administration for Child and Families US Department of Health and Human Services (Ringeisen, Casanueva, Smith, Dolan, & International, 2011). The study captures information about abuse and neglect investigations reported to child welfare, information regarding the child's family, child welfare intervention, and other services, and describe key characteristics of child development. The NSCAW II gathered information regarding children's health, mental health, and developmental risks, particularly those children who experienced severe abuse and exposure to violence. Following the NSCAW I, the NSCAW

II study was designed to better under the convergence of the welfare system with service provision to children and families, as child maltreatment continues to be a significant public health concern (Dowd et al., 2013).

Sample

The sample for the database was composed of 5,873 children selected from 81 of the 92 original NSCAW I Primary Sampling Units that was pulled from 83 counties across the United States. This within-PSU sampling frame for selecting children for the NSCAW II sample was constructed from lists or files of children who were investigated or assessed for child abuse or neglect within the sample PSU during the months February 2008 through April 2009. The sampling process was conducted over a 15 month period and included children investigated or assessed between February 2008 and April 2009 (Dowd & Dolan, 2013). Only children ages zero to 17.5 years were eligible for the study; children ages 17.5 years old and older were removed from the frame. Additionally, children who were members of the same family or household of a previously selected child (siblings of a previously selected child) were also deleted from the sampling file in order to limit the burden on families by sampling the household only once for the study. The NSCAW II contains data from multiple informants affiliated with each sampled child to get a complete picture of that child (Dolan, Smith, Casanueva, & Ringesisen, 2011). Face-to-face interviews were conducted with children, parent, non-parent adult caregivers (foster caregiver, kin caregiver, group home caregiver), and investigative caseworkers. Both children who remained in the system and those who left the system were studied for the full study period. Trained NSCAW II field representatives contacted caregivers and asked permission to assess the child directly using standardized measures in the home. They interviewed caregivers in the home. The baseline interviews, conducted with primary caregivers, child welfare caseworkers,

and children were administered from March 2008 to September 2009, on average, four months after the initial investigation. Children receiving services in their homes and those in out-of-home care were part of the sample, which included both substantiated and non-substantiated cases (Helton et al., 2017.).

Children and caregivers answered questions regarding sensitive topics in a private setting using audio computer-assisted self-interviewing (ACASI) (Dowd et al., 2013). NSCAW II field representatives conducted ACASI sessions with the child services caseworkers in their offices who were instructed to consult the case record as needed during the interview (Dowd et al., 2013). Teacher surveys were completed online or by email contact.

Approximately one half of the sample was male (50.8%). One-fifth (20.6%) of the children were 0 to 2 years old, 22.6% were 3 to 5 years old, 27.4% were 6 to 10 years old, and 29.5% were 11 to 17 years old. White children composed 41.5% of the sample, 28.3% were Hispanic, 22.4% were Black, and 7.7% described their race/ethnicity as “Other” (Ringelisen et al., 2011). At the time of the baseline interview, most children were living at home with biological or adoptive parents (87.3%), while 8.5% were living with a primary kin caregiver (Ringelisen et al., 2011). In order to ensure adequate statistical power, the sample design oversampled infants and cases receiving ongoing services after investigation. Because NSCAW II included oversampling to provide enough cases for analysis in specific categories, statistical weights are applied when performing data analysis.

Research Design Overview

The proposed secondary analysis will explore possible relationships between presence of ACE history in children with ASD or DS, and dental issues as compared to their non-disabled peers. A possible relationship between the presence of cognitive disability in a child along with

ACEs may shed light on why children with cognitive disabilities have poor dental health.

Children with cognitive disabilities, ACEs, and dental issues are variables which contain data in the NSCAW II dataset. These variables are represented in the theoretical framework as microsystem relationships between child and family, school, neighborhood, religious organization, health services and daycare facilities, all of which are found in the world of the child in the mesosystem. The ecological systems framework provides the background knowledge needed to look at data regarding ACEs, and dental issues to further understand how they intersect and relate in the life of children with cognitive disabilities.

Sample for data analysis

The sample for data analysis will be drawn from the complete data set, and chosen variables of interest explored for this proposed study. The baseline data wave will provide the bulk of the sample and include eligible participants from subsequent waves. Inclusion criteria for the sample are children between the ages of 5 and 16, both male and female, reside with their biological families, adoptive parents, or living with a primary kin caregiver. If children are in out-of-home placement such as foster care, they will be excluded since, in these care situations, caregivers have little knowledge about the medical history of the child in their care (personal communication J. Helton, April 2019.) A comparison sample, taken from the entire sample and composed of children identified by caregiver report as having ASD or DS, will provide a second sample for focus and analysis.

Variables

The dataset contains the following variables: 1) children with cognitive disabilities of ASD or DS, and children without cognitive disabilities of ASD or DS, 2) ACEs, and 3) presence of dental issues. The NSCAW II used various previously validated instruments to collect data.

The instruments are a combination of ACF and NSCAW II Consultant Group instruments along with several commonly used and validated measurement scales. These identified variables in the proposed study are derived from the research questions and the theoretical framework.

Socio-demographic Data. In alignment with the macrosystem/exosystem found in the ecological model, data analysis will include use of child sociodemographic data. This information, such as age, helps identify the entire sample and comparison sample. Race and ethnicity are not included in the specific aims and therefore not used for analysis but descriptive purposes only.

Cognitive Disability. Cognitive disability is an aspect of the children represented in the personal child domain and the microsystem. A caregiver report of an affirmative answer to the question of whether the child has ASD or DS allows measurement of this variable.

Adverse Childhood Experiences (ACEs). ACEs studied in this proposed study are represented in the microsystem domain. However, incarceration of a family member or a history of involvement with law enforcement represents a part of the exosystem domain. ACEs for this study are domestic violence in the home, household substance abuse, household mental illness, an incarcerated household member, or caregiver with previous involvement with law enforcement and documented type of child maltreatment. In the NSCAW II, domestic violence in the home data is information contained in the caseworker report.

Household substance abuse was measured by caregiver report using the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, De la Fuente, & Grant, 1998). Using a sample drawn from various countries including the United States, 1888 participated in the study, and only data obtained from drinking patients was used to select items for the AUDIT (Saunders et al., 1998). The weighted means correlation Cronbach's alpha was 0.93. Subsequent

studies found the AUDIT to be a reliable measure for identification of patients with active alcohol abuse and dependence (Higgins-Biddle & Babor, 2018). Additionally, alcohol use in the NSCAW II was measured by caseworker report from specific project developed questions in which the caseworker reports caregiver substance abuse. Since the AUDIT produces an actual score, it will be the source data for the alcohol abuse ACE variable.

The Drug Abuse Screening Test (DAST), a measure designed to assess the extent of problems related to drug misuse was another source for measuring household substance abuse. The internal consistency of the DAST coefficient reliability (coefficient alpha) is 0.92. The measure yields a total score ranging from 0-28 (Skinner, 1982).

Household mental illness was measured using the Composite International Diagnostics Interview Short-Form (CIDI-SF) module only for depression from the caregiver source (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). NSCAW II data for this ACE variable came from the short form. The tool percentages of overall classification accuracy range from 92.2% for major depressive episodes to 99% for generalized anxiety disorder (Kessler et al., 1998). However, the literature lacks validity testing after the original article by Kessler and colleagues, and it has never been tested for validity outside of the US (Carlbring et al., 2002).

Information regarding a caregiver with a recent history of arrests or detention in jail or prison came from the caseworker instrument. This measure used a specific project developed question that asked the caseworker to give information about whether the caregiver(s) had a recent history of arrests or detention in jail or prison.

Child Maltreatment. In the NSCAW II, type of child maltreatment was listed in the case file and described by the caseworker. The question asked the caseworker to state the type of abuse or neglect found in the child report. Data to be used in the proposed study for this variable

will contain reported abuse or neglect as physical, sexual, emotional, physical neglect (failure to provide) and neglect (lack of supervision).

Dental Issues. The proposed study will use reported data from the caregiver source regarding dental issues as the source for the population health variable. Data for this variable will be an affirmative answer to the presence of dental issues. Caregiver data additionally contains information regarding whether the child has even been to the dentist or dental hygienist. This data will be used for descriptive data purposes.

Sample Size

Given that the dataset contains variables on 5,973 children, the estimated sample size should have the required power for sampling. Preliminary data analysis shows that the desired sample will be approximately 8% of the dataset based on inclusionary factors of age, presence of ASD, or DS (personal communication, J. Helton, April 2019).

Data Organization and Management

The application for the Restricted NSCAW II database will be filed along with the Data Protection Plan and IRB approval from Duquesne University. The dataset will contain codebooks, User's Manual, code list by weighted and unweighted frequencies by waves and the data itself in SPSS, a statistical software program. The codebook, User's Manual and code list contain weighted, and unweighted frequencies by waves, and will be read and analyzed by the student PI to ensure understanding of the dataset, sample schemes and strategies, time frame, assessment tools, response levels, and quality control measures.

Data Analysis

Descriptive analysis. Calculation of frequency tables and cross-tabulations of all variables that can be included in the primary analysis: children with ASD or DS, ACEs scores of

the DAST, AUDIT, a yes answer in the caseworker report for a positive history of domestic violence in the home, and a yes answer from the caregiver stating their child has dental issues will be done initially. This will aid in providing information regarding the use of the coding pattern for each variable and any information needed for missing data for each variable if applicable. In the NSCAW II children ages 0-2 at baseline and children receiving child welfare services at baseline were oversampled. The base weight for each case in the sample was the inverse of the probability of inclusion of the case in the sample (Bartolet, Seltman, Greehouse, & Kelleher, 2003). Statistical calculation of all variables in the NSCAW II database is done using weighted and unweighted frequencies. Univariate descriptive analysis focusing on mean, median, and standard deviation for the continuous variables (such as scores on the AUDIT and the DAST), and categorical variables using percentages will be generated on both raw and weighted data forms. Sociodemographic data will also be analyzed using descriptive statistics to provide a clearer perspective of the sample.

Overall data analysis. Data will be analyzed using IBM SPSS Statistics 25 (IBM, 2018). The dataset will be sorted to variables of interest. Weights per variables and frequencies will be applied before any data calculations. The sample will be drawn consisting of children ages five years to 16 years found in the baseline data. From this sample population, children with ASD or DS will be identified.

Weighting must be applied to those variables that have values that need to be weighted before analysis (Cheng & Phillips, 2014). These variables are noted in the codebook for the restricted dataset (Dowd, et al., 2013). Chi-square tests for independence will be performed to test possible associations between variables. Children with cognitive disabilities will be divided into ASD and Down syndrome groups and chi-square analysis performed to test the association

between cognitive disabilities and dental issues. Next, a comparison of the children identified with ASD and Down syndrome and child maltreatment categories will be done. Lastly, chi-square analysis will also look for associations between ASD and Down syndrome and substance abuse using the AUDIT and DAST scores.

Next, binomial logistic regression will be used to estimate the association between dental issues and explanatory (independent) variables and ACEs and independent variables.

Assumptions of binomial logistic regression are there is a dichotomous dependent variable with two or more independent variables that are continuous or nominal, observations are independent, and categories of the dichotomous dependent variable and the nominal independent variables have a minimum of 15 cases per independent variable (Field, 2018). There is the assumption that there is a linear relationship between the continuous independent variables and logit transformation of the dependent variable. A binary logistic procedure in SPSS will be done first to test this assumption. The next assumption is that the data must not show multicollinearity, which can be tested by correlation coefficients and VIF values. Lastly, there should be no outliers, high leverage points, or highly influential points.

Aim 1 will test the hypothesis that children with ASD or DS, will have higher ACE scores compared to children without cognitive disabilities. Aim 1 will be explored using interpretation from descriptive statistics. **Aim 2** will test the hypothesis that there is an interaction between ACEs, ASD or DS and increased incidence of dental problems. This aim allows the creation of separate regression equations where the independent variables of children with ASD or DS and children without cognitive disabilities are statically analyzed with the dependent variables of dental ands and ACEs in order to show this interaction.

Key variable creation. The following dependent and independent variables will be operationalized in the proposed study from the dataset measures.

Dependent (outcome) variables. The primary outcome variables are ACEs and dental issues. Dental issues data will be operationalized by data obtained from questions involving dental care. In the NSCAW II dataset, the variable name is PHS3a19a, the instrument question is “To the best of your knowledge does your child currently have dental problems?”. Coding for the data is 1 = yes, 2 = no. The variable name is PHS5a; the instrument question is “In the past 12 months has your child gone to a dentist or dental hygienist for a cleaning or checkup?”. Coding for the data is 1 = yes, 2 = no.

An ACE score is the other dependent variable. This score will be calculated from data found in the dataset. In the dataset, child maltreatment will be operationalized by the data recording one or more types of maltreatment from the caseworker report. The variable name is CAA1a; the instrument question is, “Tell me what type of abuse was reported on this child?”. The codebook states: 1 = physical maltreatment, 2 = sexual maltreatment, 3 = emotional maltreatment, 4 = physical neglect (failure to provide) and 5 = neglect (lack of supervision, are the values of interest. ACEs for this proposed study are domestic violence in the home, household substance abuse, household mental illness, and incarcerated household member or caregiver with previous involvement with law enforcement. Domestic violence in the home will be operationalized report of domestic violence found in the caseworker report.

Household mental illness will be operationalized by a raw numeric score using specific variables as instructed in the codebook from answers to the modified CIDI-SF. According to the codebook, three types of depression are possible to diagnose from specific items on a modified

scale. Any computed scores from the data that show dysphoric depression will be used as the raw numeric score for data analysis.

Household substance abuse will be operationalized from scores on the AUDIT and the DAST. For the AUDIT, the operationalized variable is a score of five or higher, the recommended cut point from the NSCAW II (Dowd, et al., 2013). For the DAST, this variable will be operationalized with a score of five or higher the recommended cut point from the NSCAW II (Dowd, et al., 2013). Lastly, the presence of domestic violence is found in the caseworker report, using information from two variables, the first, C_RA27a , “Was there a history of domestic violence against the caregiver?” and variable C_RA 49a, “At the time of the investigation was there active domestic violence? All present components will count for a score of one to be added for a total score for each child to create an overall ACE score.

Independent (explanatory) variables.

Lastly, presence of ASD or DS will be operationalized as children identified by caregiver as a yes to the question of “Does your child have any of the following?” – autism spectrum disorder and yes to the same question, “Does your child have any of the following?” – Down syndrome. The second independent variable are children without ASD or DS.

Anticipated barriers and challenges. A significant challenge for this study is the learning curve required to become comfortable with the dataset, the need to understand how the data are coded, and how to use the data for analysis. The General Release version of the dataset was used to write this dissertation proposal. This version contains missing data and related information to that missing data, which decreased the ability to understand the dataset. Another major limitation of this proposed study is the use of a secondary data analysis study design. When performing secondary data analysis, the researcher must always keep in mind that the data

collected in the dataset was recorded for purposes other than their research questions. It is essential to not go beyond what information the dataset contains in order to answer a specific research question. Performing secondary data analysis from a large dataset is a limitation when the researcher has little experience running this type of study design.

Potential strategies to overcome barriers and challenges. The student PI has added another external member to the committee, who is an expert in the database and can guide data set up, design, and analysis. The new external member is a faculty member at the same university as the student PI.

Data management and protection of human subjects. A data protection plan must be filed with the application for the restricted use database. This document lists the terms in which the dataset must be housed and managed. The dataset will be on a separate, password protected computer not connected to the Internet to make sure data breach cannot occur. This computer must be located in an office or room that can be locked and secured. Although the restricted dataset is mostly de-identified, researchers are asked never to make known any identities through their analysis (this mainly applies to researchers from agencies in the Child Welfare System). Data analysis will occur by the PI in an office that can be locked and secured. Duquesne University Institutional Review Board (IRB) approval of the study processes and materials will be obtained before application for the restricted release dataset.

References

- American Nursing Association, (2019). Fact Sheet.
- American Psychological Association, (APA), A. P. A. (2013). Neurodevelopmental Disorders. In *Diagnostic and Statistical Manual of Mental Disorders*.
- Baio, J., Wiggins, L., & Christensen, D. L. (2018). Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years. *Morbidity and Mortality Weekly Report*, 67(67), 1-23.
- Barth, R. P., Biemer, P., Runyan, D., Webb, M. B., Berrick, J. D., Dowd, K., . . . Wallace, I. (2002). Methodological lessons from the National Survey of Child and Adolescent Well-Being: The first three years of the USA's first national probability study of children and families investigated for abuse and neglect. *Children and Youth Services Review*, 24(6-7), 513-541. doi:10.1016/S0190-7409(02)80002-0
- Bartolet, M., Seltman, H., Greehouse, J., & Kelleher, K. (2003). *National Survey of Adolescent Well-Being (NSCAW): A comparison of model and designed based analyses of cognitive stimulation scores*.
- Berg, K. L., Shiu, C.-S., Feinstein, R. T., Msall, M. E., & Acharya, K. (2018). Adverse Childhood Experiences Are Associated with Unmet Healthcare Needs among Children with Autism Spectrum Disorder. *The Journal of Pediatrics*, 202, 258-264.e251. doi:10.1016/j.jpeds.2018.07.021
- Berg, K. L., Shiu, C. S., Acharya, K., Stolbach, B. C., & Msall, M. E. (2016). Disparities in adversity among children with autism spectrum disorder: a population-based study. *Developmental Medicine & Child Neurology*, 58(11), 1124-1131. doi:10.1111/dmcn.13161

- Berg, K. L., Shiu, C. S., Acharya, K., Stolbach, B. C., & Msall, M. E. (2016). Disparities in adversity among children with autism spectrum disorder: a population-based study. *Dev Med Child Neurol*, 58(11), 1124-1131. doi:10.1111/dmcn.13161
- Bronfenbrenner, U. (1979). *The Ecology of Human Development Experiments by Nature and Design*.
- Carlbring, P., Forslin, P., Ljungstrand, P., Willebrand, M., Strandlund, C., Ekselius, L., & Andersson, G. (2002). Is the Internet-administered CIDI-SF equivalent to a clinician-administered SCID interview? *Cognitive Behaviour Therapy*, 31(4), 183-189. doi:10.1080/165060702321138573
- Chartier, M. J., & Walker, J. R., & Naimark, B. (2010). Separate and cumulative effects of adverse childhood experiences in predicting adult health and health care utilization. *Child Abuse & Neglect*, 34(6), 454-464.
- Cheng, H. G., & Phillips, M. R. (2014). Secondary analysis of existing data: opportunities and implementation. *Shanghai Archives of Psychiatry*, 26(6), 371 - 375.
- Dolan, M., Smith, K., Casanueva, C., & Ringesisen, H. (2011). *NSCAWS II Baseline Report: Introduction to NSCAWS II*. Retrieved from
- Dowd, K., Dolan, M., K., S., Day, O., Keeney, J., Wheelless, S., & Biemer, P. (2013). *National Survey of Child and Adolescent Well-Being II Data File Users Manual*.
- Dowd, K., & Dolan, M., Smith K., Day, O., Keeney, J., Wheelless, S. & Biemer, P. (2013). *National Survey of Child and Adolescent Well-Being II Data File Users Manual*.
- Dube, S. R., & Cook, M. L., & Edwards, V.J. (2010). Health-Related outcomes of adverse childhood experiences in Texas. *Preventing Chronic Disease*, 7(3), 1-9.

- Emerson, E. (2012). Commentary: childhood exposure to environmental adversity and the well-being of people with intellectual disabilities. *Journal of Intellectual Disability Research*, 57(7), 589-600. doi:10.1111/j.1365-2788.2012.01577.x
- Emerson, E., & Brigham, P. (2014). The developmental health of children of parents with intellectual disabilities: Cross sectional study. *Research in Developmental Disabilities*, 35(4), 917-921. doi:http://dx.doi.org/10.1016/j.ridd.2014.01.006
- Emerson, E., & Brigham, P. (2015). Exposure of children with developmental delay to social determinants of poor health: Cross-sectional case record review study. *Child: Care, Health and Development*, 41(2), 249-257. doi:10.1111/cch.12144
- Emerson, E., & Hatton, C. (2007). Poverty, socio-economic position, social capital and the health of children and adolescents with intellectual disabilities in Britain: a replication. *Journal of Intellectual Disability Research*, 51(11), 866-874.
- Emerson, E., & Spencer, N. (2015) Health Inequity and Children with Intellectual Disabilities. In: *Vol. 48. International Review of Research in Developmental Disabilities* (pp. 11-42).
- Felitti. (2002). The relationship between adverse childhood experiences and adult health: Turning gold into lead. *The Permanente Journal*, 6(1), 44-51.
- Felitti, V. J., & Anda, R. F., Nordenberg, D., Williamson, D.E., Spitz, A.M., Edwards, V.,...Marks, J.S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood events (ACE) study. *American Journal of Preventive Medicine*, 14(4), 245-258.
- Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics North American Edition* (5 ed.). Thousand Oaks, California: SAGE.

- Forman-Hoffman, V., Ault, K. L., Anderson, W., Weiner, J., Stevens, A., Campbell, V., & Armour, B. (2015). Disability status, mortality, and leading causes of death in the United States community population. *Medical Care*, 53(4), 346 - 354.
- Genereaux, D., & van Karnebeek, C. B., P.H. (2015). Costs of caring for children with an intellectual developmental disorder. *Disability and Health Journal*, 8(4), 645-651.
- Glover, G., Williams, R., Heslop, P., Oyinlola, J., & Grey, J. (2017). Mortality in people with intellectual disabilities in England. *Journal of Intellectual Disability Research*, 61(1), 62-74. doi:10.1111/jir.12314
- Harrell, E. (2017). Crime Against Persons with Disabilities, 2009-2015 Statistical Tables (Statistical database). (NCJ250632). Retrieved January 15, 2018, from Bureau of Justice Statistics <https://www.bjs.gov/content/pub/pdf/capd0915st.pdf>
- Hatton, C., & Emerson, E. (2004). The Relationship Between Life Events and Psychopathology Amongst Children with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities*, 17(2), 109-117. doi:10.1111/j.1360-2322.2004.00188.x
- Hatton, C., & Emerson, E. (2004). The Relationship Between Life Events and Psychopathology Amongst Children with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities*, 17(2), 109-117. doi:10.1111/j.1360-2322.2004.00188.x
- Helton, J. J., Gochez-Kerr, T., & Gruber, E. Sexual Abuse of Children With Learning Disabilities. *Child Maltreatment*, 0(0), 1077559517733814. doi:10.1177/1077559517733814
- Higgins-Biddle, J. C., & Babor, T. F. (2018). A review of the Alcohol Use Disorders Identification Test (AUDIT), AUDIT-C, and USAUDIT for screening in the United

- States: Past issues and future directions. *American Journal of Drug & Alcohol Abuse*, 44(6), 578-586. doi:10.1080/00952990.2018.1456545
- Honor, G., & Fischer, B. A. (2016). Child sexual abuse revictimization: Child demographics, familial psychosocial factors, and sexual abuse case characteristics. *Journal of Forensic Nursing*, 12(4), 151-159. doi:10.1097/JFN.0000000000000124
- IBM. (2018). SPSS 25.
- Kageleiry, A., Samuelson, D., Duh, M. S., Lefebvre, P., Campbell, J., & Skotko, B. G. (2017). Out-of-pocket medical costs and third-party healthcare costs for children with Down syndrome. *American Journal of Medical Genetics Part A*, 173(3), 627-637. doi:doi:10.1002/ajmg.a.38050
- Kerker, B. D., Storfer-Isser, A., Szilagyi, M., Stein, R. E. K., Garner, A. S., O'Connor, K. G., . . . Horwitz, S. M. (2016). Do Pediatricians Ask About Adverse Childhood Experiences in Pediatric Primary Care? *Academic Pediatrics*, 16(2), 154-160. doi:https://doi.org/10.1016/j.acap.2015.08.002
- Kerns, C. M., Newschaffer, C. J., Berkowitz, S., & Lee, B. K. (2017a). Brief Report: Examining the Association of Autism and Adverse Childhood Experiences in the National Survey of Children's Health: The Important Role of Income and Co-occurring Mental Health Conditions. *Journal of Autism and Developmental Disorders*, 47(7), 2275-2281. doi:http://dx.doi.org/10.1007/s10803-017-3111-7
- Kerns, C. M., Newschaffer, C. J., Berkowitz, S., & Lee, B. K. (2017b). Brief report: Examining the association of autism and adverse childhood experiences in the national survey of children's health: The important role of income and co-occurring mental health

- conditions. *Journal of Autism and Developmental Disorders*, 47(7), 2275-2281.
doi:10.1007/s10803-017-3111-7
- Kessler, R. C., Andrews, G., Mroczek, D., Ustun, B., & Wittchen, H.-U. (1998). The World Health Organization Composite International Diagnostic Interview short-form (CIDI-SF). *International Journal of Methods in Psychiatric Research*, 7(4), 171-185.
doi:10.1002/mpr.47
- Kindig, D., & Stoddart, G. (2003). What Is Population Health? *American Journal of Public Health*, 93(3), 380-383. doi:10.2105/ajph.93.3.380
- Kopycka-Kedzierawski, D. T., & Auinger, P. (2008). Dental Needs and Status of Autistic Children: Results From the National Survey of Children's Health. *Pediatric Dentistry*, 30(1), 54-58.
- Lauer, E., & McCallion, P. (2015). Mortality of People with Intellectual and Developmental Disabilities from Select US State Disability Service Systems and Medical Claims Data. *Journal of Applied Research in Intellectual Disabilities*, 28(5), 394-405.
doi:10.1111/jar.12191
- Loo, C. Y., Graham, R. M., & Hughes, C. V. (2008). The caries experience and behavior of dental patients with autism spectrum disorder. *Journal of the American Dental Association*, 139(11), 1518-1524.
- Maclean, M. J., Sims, S., Bower, C., Leonard, H., Stanley, F. J., & O'Donnell, M. (2017). Maltreatment Risk Among Children With Disabilities. *Pediatrics*, 139(4).
doi:10.1542/peds.2016-1817
- McDonnell, C. G., Boan, A. D., Bradley, C. C., Seay, K. D., Charles, J. M., & Carpenter, L. A. (2018). Child maltreatment in autism spectrum disorder and intellectual disability: results

- from a population-based sample. *Journal of Child Psychology and Psychiatry*, 0(0).
doi:doi:10.1111/jcpp.12993
- McKenzie, K., Milton, M., Smith, G., & Ouellette-Kuntz, H. (2016). Systematic Review of the Prevalence and Incidence of Intellectual Disabilities: Current Trends and Issues. *Current Developmental Disorders Reports*, 3(2), 104-115. doi:10.1007/s40474-016-0085-7
- Musumeci, M., & Foutz, J. (2018). *Medicaid's Role for Children with Special Health Care Needs: A Look at Eligibility, Services, and Spending*. Retrieved from <http://files.kff.org/attachment/Issue-Brief-Medicoids-Role-for-Children-with-Special-Health-Care-Needs-A-Look-at-Eligibility-Services-and-Spending>
- National Data Archive on Child Abuse and Neglect. (2019). All NSCAW Series Publications 2015 - 2019. Retrieved from <https://www.zotero.org/groups/421939/candl/items/order/dateModified/sort/asc/tag/NSCAW>
- O'Leary, L., Cooper, S.-A., & Hughes-McCormack, L. (2018). Early death and causes of death of people with intellectual disabilities: A systematic review. *Journal of Applied Research in Intellectual Disabilities*, 31(3), 325-342. doi:10.1111/jar.12417
- Parker, S. E., Mai, C. T., Canfield, M. A., Rickard, R., Wang, Y., Meyer, R. E., . . . Network, f. t. N. B. D. P. (2010). Updated national birth prevalence estimates for selected birth defects in the United States, 2004–2006. *Birth Defects Research Part A: Clinical and Molecular Teratology*, 88(12), 1008-1016. doi:10.1002/bdra.20735
- Patch, M., Anderson, J. C., & Campbell, J. C. (2018). *Injuries of women surviving intimate partner strangulation and subsequent emergency health care seeking: An integrative*

- evidence review.*, 44(4), 384-393.
- doi:doi:http://dx.doi.org.authenticate.library.duq.edu/10.1016/j.jen.2017.12.001
- Pediatrics, A. A. o. (2014). Addressing Adverse Childhood Experiences and Other Types of Trauma in the Primary Care Setting. *The Resilience Project*.
- Periodontology, A. A. o. (2019). Gum Disease and Heart Disease. Retrieved from <https://www.perio.org/consumer/gum-disease-and-heart-disease>
- Ringeisen, H., Casanueva, C., Smith, K., Dolan, M., & International, R. (2011). *NSCAW II Baseline Report : Children's Services*. Retrieved from Washington, DC:
- Saunders, J. B., Aasland, O., Babor, T., De la Fuente, J., & Grant, M. (1998). Development of the Alcohol Use Identification Test AUDIT: WHO Collaborative Project on Early Detection of Person with Harmful Alcohol Consumption II. *Addiction*, 88(6), 791-804.
- Services, T. M. C. H. B. o. t. U. D. o. H. a. H. (2011). *Fast Facts: 2011/12 National Survey of Children's Health*. Retrieved from: www.childhealthdata.org
- Services, U. D. o. H. a. H. (2000). *Oral health in America: A report of the surgeon general*. Retrieved from Rockville, MD:
- Shonkoff, J. P., & Garner, A. S. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129, e232 - e246. doi:10.1542/peds2011-2663
- Skinner, H. A. (1982). The Drug Abuse Screening Test. *Addictive Behaviors*, 7, 363-371.
- Sullivan, P. (2009). Violence Exposure Among Children with Disabilities. *Clinical Child & Family Psychology Review*, 12(2), 196-216. doi:10.1007/s10567-009-0056-1
- Sullivan, P., & Knutson, J. F. (1998). The Association Between Child Maltreatment and Disabilities in a Hospital-Based Epidemiological Study. *Child Abuse & Neglect*, 22(4), 271-288. doi:[https://doi.org/10.1016/S0145-2134\(97\)00175-0](https://doi.org/10.1016/S0145-2134(97)00175-0)

US Department of Health and Human Services, N. I. o. D. a. C. R. (2009). Practical oral care for people with Down syndrome. In U. D. o. H. a. H. Services (Ed.), (Vol. 09-5194, pp. 1-8). Washington, DC: National Institutes of Health.

Washington State Department of Health. (2010). Oral health fact sheets for patients with special needs.

Wissink, I. B., van Vugt, E., Moonen, X., Stams, G.-J. J. M., & Hendriks, J. (2015). Sexual abuse involving children with an intellectual disability (ID): A narrative review. *Research in Developmental Disabilities, 36*(Supplement C), 20-35.

doi:<https://doi.org/10.1016/j.ridd.2014.09.007>

Zablotsky, B., Black, S. I., & Blumberg, S. J. (2017). *Estimated Prevalence of Children with Diagnosed Developmental Disabilities in the United States 2014 - 2016*. (291). Retrieved from Hyattville, MD:

Abstract

Children with cognitive disabilities are more vulnerable than children without cognitive disabilities to becoming victims of abuse of abuse and neglect. Additionally, research undertaken in the general population shows that exposure to adverse childhood experiences (ACES) has a significantly detrimental impact on health and well-being across the life course. Forensic nurses care for victims of trauma, abuse, and neglect such as children with cognitive disabilities, yet the impact of these ACEs is largely unknown particularly in regard to their health outcomes. This integrative review of the literature aims to evaluate the relationship discussed in the current literature related to ACEs and health outcomes in children with cognitive disabilities and to identify opportunities to add to the body of evidence-based forensic nursing practice toward improved health outcomes in this vulnerable population.

Keywords: children with cognitive disabilities, forensic nurses, adverse childhood experiences, health outcomes

Examining the interaction of adverse life events and health outcomes among children with
cognitive disabilities: an integrated review

Background

Intellectual disability is defined as a significantly reduced ability to comprehend new or complex information and apply new skills (World Health Organization (WHO), 2013). It includes impaired social functioning, begins before adulthood, and has a lasting effect on development (Emerson & Brigham, 2014). Diagnosis such as Autism spectrum disorder (ASD) and Down syndrome (DS) are included in this definition. For this review, the term children with cognitive disabilities will be applied so as to include a focus on functional impairment as found in diagnoses such as ASD and DS, while excluding diagnoses such as Attention Deficit Hyperactivity Disorder (ADHD) considered to be a learning disability.

Children with cognitive disabilities present with the same health issues as found in the general population such as heart disease and diabetes. Many also have co-morbid conditions such as epilepsy, depression, post-traumatic stress disorder and anxiety (WHO, 2013). This population is vulnerable to the development of non-communicable chronic health illnesses such as obesity, asthma, and dental issues due to the influence of behavioral risk factors such as physical inactivity and poor dietary preferences.

Research undertaken in the general population shows that exposure to adverse childhood experiences (ACES) has a significantly detrimental impact on health and well-being across the life course (Chartier & Walker, 2010; Dube & Cook, 2010; Felitti & Anda, 2002; Felitti, 1998). According to Felitti and colleagues (Felitti, et al., 1998), ACES include physical and sexual abuse, emotional abuse, neglect, intimate partner violence (IPV), mother treated violently,

substance misuse in the household, mental illness within a household, parental separation or divorce, and incarcerated household member. The presence of one or several ACES creates a cumulative environmental adversity resulting in poor health outcomes affecting neurobiological, social, and psychological pathways through which these adversities impair health (Emerson, 2013).

Children with cognitive disabilities are more vulnerable than children without cognitive disabilities to becoming victims of abuse and neglect (Emerson & Brigham, 2015; Sullivan & Knutson, 1998). Additionally, they have a higher rate of abuse along with poorer health outcomes such as increased dental issues and a higher prevalence of asthma than children without cognitive disabilities (Kohane et al., 2012; Maclean et al., 2017; P. Sullivan, 2009; Xie et al., 2020). A need exists to explore how cognitive disabilities may influence the relationship with adverse life events and health outcomes.

Problem Identification and Specific Aims

While the literature shows that children with cognitive disabilities have poorer health outcomes and are victimized at a higher rate than peers without disability (Emerson & Brigham, 2015; Emerson & Hatton, 2007; Kohane et al., 2012; Maclean et al., 2017), it also lacks substantial studies regarding the effect of ACEs on children with cognitive disabilities. Consequently, healthcare providers lack education in understanding how certain adverse life events affect children with cognitive disabilities leading to poorer health outcomes. Because these children present with complex healthcare needs, providers must be ready to intervene to eliminate the risk of exposure to ACEs and abuse.

The purpose of this integrative review is to analyze the literature and synthesize the research regarding adverse life events, and health outcomes in children with cognitive

disabilities. The review aims to evaluate the relationship discussed in the current literature related to adverse life events and health outcomes in children with cognitive disabilities and identify opportunities for future forensic nursing research in helping to improve health outcomes in children with cognitive disabilities.

Review Method

This study is an integrative review using the method of Whitemore and Knafl (2005) in which researchers search and evaluate a both experimental and non-experimental studies with the possibility of playing a larger role in building evidence-based nursing practice regarding the topic or phenomenon.

Literature Search

The second stage of the review process is the literature search stage detailing strategies used to obtain the relevant literature on the topic of interest (Whitemore & Knafl, 2005). During this stage searches were conducted using the CINAHL, PubMed, ERIC and PSYINFO electronic databases with the aid of a university health sciences librarian. While the basic terms of “cognitive disability”, “child maltreatment”, “adverse life events” and “health outcomes” were present in all searches and connected with the Boolean operator “AND”, all searched included multiple terms representative of those terms in that database. For instance, “cognitive disability” also included terms such as “intellectual disability”, “developmental delay” and “autism spectrum disorder” connected by the Boolean operator “OR”. Inclusion criteria included peer-reviewed papers in English from 1998 to 2018 with children under 18 years as the population focus. Papers were excluded if the population of interest was over 18 and published before 1998. The 1998 cut off refers to the year studies about ACEs were introduced in the literature.

A total of 649 articles were exported from the database search results in Covidence, a management system that expedites and records the search process (Covidence, 2018). After removal of 23 duplications, 626 articles were left for screening. Abstracts of those articles were screened for inclusion and exclusion criteria along with applicability to the review purpose and aims. From the abstract review, 604 articles were identified as irrelevant, leaving 22 articles for full-text screening. Several of the articles in this group were either commentary articles, other reviews, identified a type of intervention (education achievement in school), included wrong population of focus (discussed childhood experiences of adults), or included wrong outcomes (the focus was only finding behavioral or emotional issues). Reference lists of these full-text articles were also reviewed but did not reveal any additional articles (Whittemore & Knafl, 2005). The final review resulted in five articles for evaluation and analysis (see Table 1.)

Data Evaluation

The final articles for this integrative were all quantitative studies. Of these five, four were cross-sectional-secondary-data analysis and one was a retrospective chart review (Berg, et al., 2016; Emerson & Brigham, 2015; Hatton & Emerson, 2004; Hornor & Fischer, 2016; Kerns, et al., 2017). Secondary data analysis uses data previously gathered via a specific instrument or tool in an interview or survey in a representative population (Creswell & Plano Clark, 2018). Two of the final studies used data from the 2011-2012 National Survey of Child Health (Berg et al., 2016; Kerns, et al., 2017), while the other two studies used data derived from the National Health Trust (Emerson & Brigham, 2015) and the British Office for National Statistics providing a strong look at the topic of concern for children in a country outside of the United States (Hatton & Emerson, 2004).

For data evaluation, a validated 16-item Quality Assessment Tool for Studies of Diverse Designs (QATSDD) by Sirreyah, Lawton, Gardner and Armitage (2012) was used. The QATSDD can be used to assess a diversity of studies and provides a high level of rigor to the assessment of both qualitative and quantitative studies. Only 14 of the 16 items are applicable to quantitative studies and therefore were used to evaluate each of the five sample studies. The tool provides specific written criteria for each item with ratings of 0 = not at all, 1 = very slightly, 2 = moderately, and 3 = complete. The highest possible score is 42. Once the tool was used to score a study, the 14 item scores were added to obtain a single score out of 42. Then a percentage was calculated as the final rating score for the study. Higher percentages represent studies in which the target sample was a reasonable size and the design, methods, and data analysis were a good fit with the stated research question and the three aims of this integrative review. Scores for the five studies ranged from 50% to 62% showing the studies contributed almost equally to the final data analysis.

Data Analysis

According to Whittmore and Knafl (2005), during the data analysis stage data from the primary sources are categorized, organized and summarized into an integrated conclusion about the research problem under study. This step involved data extraction from all five studies which included study purpose and design, sample, findings, limitations, and data evaluation which included scores from the QATSDD instrument.

The data analysis stage continued with a focus on the data extracted from each study and comparing these data to identify themes, patterns or relationships (Whittmore & Knafl, 2005). The data results were organized into a table and then divided according to presence of variables in the stated aims, patterns and themes between/among the variables particularly with health

outcomes, and any new intervening factors that may influence the aims of the integrative review (Whittemore & Knafl, 2005). Once categorized, the data were displayed under the data extraction column and coded according to the categories previously stated. Data were further organized and coded according to the direct application of the aims of the study.

Results

Description of Sample Studies

All five studies identified a sample population that included children with cognitive disabilities. All selected studies were published within the last 20 years; the oldest study published in 2004. The sample populations were all composed of children under 18 years, are predominantly white and male. Other races represented in the sample populations includes African American, Hispanic, and South Asian (Berg et al., 2016; Hatton & Emerson, 2004; Hornor & Fischer, 2016). Four of the five studies used the same design: a secondary data analysis using data from a large national dataset. All the datasets contained most of the variables of interest in this review.

Terminology is especially important in the sample population of all five studies. Terms used to describe the study samples includes children identified as being developmentally delayed, intellectually delayed, and children with ASD. The World Health Organization (WHO) uses the blanket term, “intellectual disability” classifying ASD and developmental delays within that category. For this review, cognitive disability refers to functional impairments of mental processes, focusing on resulting deficits due to the cognitive disorder. The Diagnostic and Statistics Manual of Mental Disorders 5 (DSM-V), classified the diagnosis as intellectual developmental disorder. The diagnosis includes impairments in mental functioning such as reasoning, problem-solving, and judgement along with adaptive impairments that stem from

mental functioning such as communication, social skills, and independence in activities of daily living (American Psychiatric Association (APA), 2014). Finally, the impairment in mental functioning was evident during the childhood period.

Relationship between ACEs and Health Outcomes in Children with Cognitive Disabilities

Findings regarding the relationship between ACEs and health outcomes in children with cognitive disabilities focused on parental difficulties and co-morbid mental health issues as main ACEs which affected this relationship. Using “cognitive disability” as the definitive terminology, this review suggests that this population has an increased risk of exposure to ACEs. Both Kerns and colleagues (2015) and Berg and colleagues (2016) found that children with ASD have an increased probability of exposure to a larger number of ACEs. They identified income insufficiency, not considered an ACE, along with neighborhood violence, parental divorce, mental illness in the family, and substance abuse as the specific ACEs responsible for the increased exposure. Downstream social determinants of health (SDOH) were identified by Emerson and Brigham (2015) as ACEs and low socioeconomic position (SEP). Specific ACEs identified related to parental attributes such as poor parental mental health, parents with a prior history of abuse, single parent family, parents that are separated or divorced, interpersonal violence (IPV) and alcohol and substance abuse as the most important factors that increased the risk of poorer health outcomes in their sample (Emerson & Brigham, 2015).

Similar adversities related to parental difficulties were identified by Hornor and Fischer (2016). Working with a sample population composed entirely of children under age 18 who had been sexually abused, the sample was divided into children who has been assessed for child sexual abuse only one time in the one-year period (the one-time assessment group), and children who had been assessed for child sexual abuse more than one time in the one year period (the

revictimization group). Children in the revictimization group were more likely to have a developmental delay and/or have a mental health diagnosis. Family characteristics included receiving public assistance, financial concerns, along with a history of involvement with law enforcement and/or child protective services, having drug and alcohol problems, mental health issues, and a history of IPV.

SDOH are defined as “conditions in environments where people live and develop that affect a wide range of health, functioning, quality of life outcomes and risks (Office of Disease Prevention and Promotion, 2018). ACEs are included in this definition. For children with cognitive disabilities, a synergist event occurs when parents of children with cognitive disabilities experience parental difficulties. These difficulties play a significant role in mediating the effects of low SEP because they increase the number of ACEs in the child’s life, cumulatively resulting in poorer health outcomes (Emerson & Brigham, 2015).

Relationship Between Child Maltreatment and Health Outcomes in Children with Cognitive Disabilities

In their study, Hornor and Fischer (2016) identified differences in the support systems between the one-time assessment group and the revictimization group: the one-time assessment group had more supportive parents. Parents of the children in the revictimization group were less likely to believe in the authenticity of the sexual abuse allegation and be supportive of their child. Given the previous parental difficulties identified, it is likely that the coexistence of certain psychosocial risk factors or adverse life events increase the risk for sexual abuse. This knowledge leads to a pathway to discover a much more direct relationship between child maltreatment and health outcomes. Additionally, three of the studies in this review also

identified co-morbid mental health diagnoses as an important factor when looking at the interplay between children with cognitive disabilities and factors affecting poor health outcomes.

Many children with cognitive disabilities have co-morbid mental health diagnoses. Four of the five studies found that mental health issues were related to poor health outcomes in children with cognitive disabilities. Some asserted part of the burden was due to ACEs (Berg et al., 2016; Hatton & Emerson, 2004; Hornor & Fischer, 20162016). Some of these mental health issues are also a characteristic of one or both parents (Emerson & Brigham, 2015; Hornor & Fischer, 2016)

The presence of mental health diagnoses co-occurring in the general population and related to the presence of multiple ACEs has been well-established (Chartier, Walker & Naimark, 2009; Dube & Cook, 2010; Low et al., 2012). Studies in this review found children with cognitive disabilities had an increased prevalence of diagnosed psychiatric disorders, and an increased rate of anxiety, depression, and behavioral problems compared to peers without disabilities (Hatton & Emerson, 2004; Kerns, et al., 2017). The study by Hornor and Fischer (2016) found that children in a sexual assault revictimization group were more likely to have a developmental delay and mental health diagnosis. They were also more likely to have parents with mental health issues. Additionally, Hatton and Emerson (2004) found children with cognitive disabilities not only had an increased prevalence of diagnosed psychiatric disorders, but they also experiences more ACEs such as parental difficulties that included low SEP. Mental health as an issue in this population related to adversity helps to increase the risk of poor outcomes particularly in light of known social determinants of mental health (Allen, Balfour, Bell, & Marmot, 2014).

There is good evidence showing that children with cognitive disabilities have poorer health outcomes than their peers without disability. Regarding physical health, Berg and colleagues (2016) acknowledged the well-known link between obesity, poor diet, and being sedentary. Many children with cognitive disabilities are picky eaters or have very poor diets which include a lot of fatty and high carbohydrate food and are at increased risk of obesity (Walker & McPherson, 2018; Wang et al., 2018). Additionally, due to their disability, many children in this population are sedentary and not very active daily (Hinckson & Curtis, 2013). These lifestyle habits are also found in the general population of children, however, the role of ACEs, particularly child maltreatment with intervening factors such as low SEP and the presence of family mental health issues substantially increases the likelihood of poor health outcomes in this population (Hornor & Fischer, 2016).

Other health outcomes, such as dental issues and asthma in children with cognitive disabilities may also be affected by specific ACEs. It is not unusual for SEP to play a role in health outcomes in most populations. It is, however, extremely important to find an increased exposure of ACEs in children with cognitive disabilities and to be moderated by SEP and incidentally co-occurring family mental health diagnoses. These results are solid proof that health outcomes in this population are poorer due to a plethora of socioeconomic and psychosocial factors that constantly interact with one another, creating extreme risk of long-term harm and probably early mortality (Kerns, et al., 2017).

Limitations

The outstanding limitation for this review is terminology related to the sample population of the studies. All searches needed to include several terms to capture the terminology of the database searched. Because a lack of consistent terminology remained a constant factor in each

step of the review, terminology was addressed and defined for the purpose of creating a more cohesive review. Due to the lack of similar and specifically defined sample populations in the review, results may not reflect the true population of children with cognitive disabilities. The studies also lack results regarding any racial or ethnic differences that exist in the results. Considering the importance of SEP in this review, results may not accurately reflect the true situations for this population for African American, Asian, and Hispanic populations.

Discussion

The purpose of this review was to analyze the literature and synthesize the research regarding adverse life events (in particular child maltreatment) and health outcomes in children with cognitive disabilities. This review provided five studies using these concepts; all studies provided significant findings regarding the identified problem. These studies suggest that, for children with cognitive disabilities, there is an important relationship with specifically identified ACES, particularly, those pertaining to parent difficulties. This relationship includes factors such as concomitant mental health issues found in both children and their parents. While it is unclear how much mental health diagnoses are a part of their cognitive disabilities or from exposure to ACEs, the presence of a mental health diagnosis in either the child with a cognitive disability and/or the parent of that child should be significant enough to signal a very high risk for poor health outcomes. The Berg and colleagues (2016) and Kerns and colleagues (2017) studies provided significant evidence to show the interplay of mental health in this problem as they focused on a population of children with ASD, defined previously as a cognitive disability.

ASD, in fact, is an excellent sub type of cognitive disability with which to make this connection. ASD has a large spectrum of symptomatic involvement making each child quite unique. The fact that both studies found an increased exposure to ACEs in children with ASD

with Kerns and colleagues (2017) additionally finding an increased prevalence of mental health and behavior disorders, suggest there are other risk factors also present in the lives of these children affecting the increased exposure such as having a cognitive disability, specific ACEs relating to parenting difficulties and/or being a member of low income family.

Low SEP in this relationship is a vital factor. Although not considered an ACE but in fact a downstream determinant of health as identified by Emerson and Brigham (2015), it can be considered a parental difficulty. In fact, low SEP in this relationship had a large effect on the increased incidence of ACEs in the Kerns et al (2017) study while Hornor and Fischer (2016) found it was a family characteristic in the revictimization group. Hatton and Emerson (2004) and Emerson and Brigham (2015) found low SEP to be a mediating and intervening factor.

While the results of this review show a dynamic relationship exists between/among children with cognitive disabilities ACEs and health outcomes, there is an overall lack of rationale offered for the results. This gap is probably due to a lack of a theoretical framework for all of the studies. While Emerson and Brigham (2015) mention some of their results fit the Family Stress Model of Parenting (Masarik & Conger, 2017), they do not use it as the basis for their variables in the research questions and method of study and analysis. Hornor and Fischer (2016), the only nurse researchers in this review, used the theme of revictimization as the framework for discovering child demographic characteristics and familial psychosocial characteristics associated with sexual abuse revictimization. Studies without a unifying framework lack context for their results (Fawcett, 2015).

This review covered existing research studies which focused on several probable issues associated with ACEs in populations of children with cognitive disabilities and provided information on how cognitive disabilities may moderate the relationship between ACEs and

health outcomes. A gap in the literature still exists to further explain the underlying mechanisms involved. Does the presence of cognitive disabilities moderate the relationships between certain ACEs and certain health outcomes, particularly in light of evidence that poorer health outcomes manifest before adulthood?

Implications for Forensic Nursing Practice and Policy

All healthcare providers who serve children need the knowledge found in this integrative review. There are several ways to accomplish this goal. First, all education curriculums for nursing, medical and all other health sciences students must include information on this population, the risks, and their socioeconomic and psychosocial factors which create poorer health outcomes. Second, nursing students must be exposed to this population in a clinical setting to experience and interact with them. Because of the cognitive disabilities, many nursing students find it difficult to interact and communicate with this population in a clinical setting let alone care for their basic needs. Without practical application, students do not attain the level of active evidence-based decision making skills needed to provide appropriate care interventions that create better health outcomes (Thompson, Cullum, McCaughan, Sheldon, & Raynor, 2004). In clinical practice, forensic nurses may treat a higher proportion of children with cognitive disabilities due to their increased vulnerability. Forensic nurses need more information about how ACEs affect the healthcare of this population in order to practice evidence-based decision making that affects positive health outcomes for children with cognitive disabilities. Education and practice must also be framed in evidence-based trauma-informed care. Trauma-informed care is “an evidence-based approach to deliver healthcare in a way that recognizes and responds to the long term health effects of the experience of trauma in patients’ lives” (Koetting, 2016, p. 206). Healthcare institutions that provide care should develop in-house education programs for

all staff, administration, and healthcare providers to learn to practice trauma-informed care in all interventions with all populations, especially vulnerable populations more likely to have trauma histories (Lewis-O'Connor, 2015). A recent study by Drake et al., (2018) showed that forensic nurses seek more evidence-based information on vulnerable populations and desire more information on trauma-informed care practices to care for them.

Forensic nurses must also continue to practice advocacy for children with cognitive disabilities as a form of social justice. Abuse and trauma are witnessed daily by forensic nurses in their clinical practice. By advancing social justice through clinical practice derived from knowledge contained within this review, forensic nurses can learn to fulfill an ethical responsibility of their profession and increase the quality of healthcare services received by children with cognitive disabilities. In clinical practice, forensic nurses advance social justice when they identify social injustices such as adverse childhood experiences and social determinants of health within vulnerable populations they serve as dehumanizing conditions that lead to poor health outcomes. Forensic nursing practice has a social mandate to respond to human conditions in all endeavors relating to practice, policy and research particularly those conditions found in children with cognitive disabilities (American Nurses Association Center for Ethics and Human Rights, 2019)

Opportunities identified for future nursing research

Future research recommendations were mentioned only in two of the five studies. They include the need for improved understanding, screening prevention and treatment of mental health concerns and ACEs (Kerns, et al., 2017) and the need for a more abundant description of the relationship between familial psychosocial risk factors and sexual abuse revictimization (Hornor & Fischer, 2016). Indeed, more research on understanding the interplay of children with

cognitive disabilities, ACEs and mental health concerns and their effect on health outcomes is needed along with practical application of the results for healthcare providers. However, the inclusion of child maltreatment and its' effect in this population is an integral part of understanding the health care needs of this population. The study by Hornor and Fischer (2016) provides rich information regarding child maltreatment, a variable not captured by any of the other four studies.

Conclusions

The results of this review have shown that ACEs are not only more prevalent in the lives of children with cognitive disabilities, but that they can be implicated in leading to poorer health outcomes. Intervening factors such as low SEP and concomitant mental health disorders are involved in this problem. Therefore, what mechanisms are involved in the relationship between specific ACEs in the lives of children with cognitive disabilities and health outcomes? This gap leads to several opportunities for forensic nurse researchers to explore possible intervention strategies to create stronger evidence-based practice, manage support systems for parents of these children, and create surveillance guidelines for education and practice.

References

- Allen, J., Balfour, R., Bell, R., & Marmot, M. (2014). Social determinants of mental health. *Int Rev Psychiatry*, 26(4), 392-407. doi:10.3109/09540261.2014.928270
- American Nurses Association Center for Ethics and Human Rights. (2019). *Nurse's Role in Providing Ethically and Developmentally Appropriate Care to People with Intellectual and Developmental Disabilities*. In Silver Springs, MD: American Nurses Association.
- American Psychological Association. (2014). *Diagnostics and Statistics Manual (DSM) (Vol. 5)*. Washington, DC: American Psychiatric Association.
- Berg, K. L., Shiu, C. S., Acharya, K., Stolbach, B. C., & Msall, M. E. (2016). Disparities in adversity among children with autism spectrum disorder: a population-based study. *Dev Med Child Neurol*, 58(11), 1124-1131. doi:10.1111/dmcn.13161
- Chartier, M. J., & Walker, J. R., & Naimark, B. (2010). Separate and cumulative effects of adverse childhood experiences in predicting adult health and health care utilization. *Child Abuse & Neglect*, 34(6), 454-464.
- Chartier, M. J., Walker, J. R., & Naimark, B. (2009). Health risk behaviors and mental health problems as mediators of the relationship between childhood abuse and adult health. *American Journal of Public Health*, 99(5), 847-854. doi:10.2105/AJPH.2007.122408
- Covidence. (2018). *An Introduction to Covidence*. Retrieved from <https://www.covidence.org/home>
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and Conducting Mixed Methods Research (Third ed.)*. Thousand Oaks, CA: SAGE.

- Drake, S., & Koetting, C., Thimsen, K., Downing, N., Porta, C., Hardy, P., Valentine, J.L., Finn, & C., Engebretson, J. (2018). Forensic Nursing State of the Science: Research and Practice Opportunities. *Journal of Forensic Nursing*, 14(1), 3-10.
doi:10.1097/JFN.0000000000000181
- Dube, S. R., & Cook, M. L., & Edwards, V.J. (2010). Health-Related outcomes of adverse childhood experiences in Texas. *Preventing Chronic Disease*, 7(3), 1-9.
- Emerson, E. (2013). Commentary: Childhood Exposure to Environmental Adversity and the Well-Being of People with Intellectual Disabilities. *Journal of Intellectual Disability Research*, 57(7), 589-600.
- Emerson, E., & Brigham, P. (2014). The developmental health of children of parents with intellectual disabilities: Cross sectional study. *Research in Developmental Disabilities*, 35(4), 917-921. doi:http://dx.doi.org/10.1016/j.ridd.2014.01.006
- Emerson, E., & Brigham, P. (2015). Exposure of children with developmental delay to social determinants of poor health: Cross-sectional case record review study. *Child: Care, Health and Development*, 41(2), 249-257. doi:10.1111/cch.12144
- Emerson, E., & Hatton, C. (2007). Poverty, socio-economic position, social capital and the health of children and adolescents with intellectual disabilities in Britain: a replication. *Journal of Intellectual Disability Research*, 51(11), 866-874.
- Fawcett, J. (2015). Theory testing and theory evaluation. In J. B. R. Butts, J.L. (Ed.), *Philosophies and theories for advanced nursing practice* (2 ed., pp. 593-611). Burlington, MA: Jones & Bartlett Learning.
- Felitti. (2002). The relationship between adverse childhood experiences and adult health: Turning gold into lead. *The Permanente Journal*, 6(1), 44-51.

- Felitti, V. J., & Anda, R. F., Nordenberg, D., Williamson, D.E., Spitz, A.M., Edwards, V.,...Marks, J.S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood events (ACE) study. *American Journal of Preventive Medicine*, 14(4), 245-258.
- Hatton, C., & Emerson, E. (2004). The Relationship Between Life Events and Psychopathology Amongst Children with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities*, 17(2), 109-117. doi:10.1111/j.1360-2322.2004.00188.x
- Hinckson, E. A., & Curtis, A. (2013). Measuring physical activity in children and youth living with intellectual disabilities: a systematic review. *Res Dev Disabil*, 34(1), 72-86. doi:10.1016/j.ridd.2012.07.022
- Honor, G., & Fischer, B. A. (2016). Child sexual abuse revictimization: Child demographics, familial psychosocial factors, and sexual abuse case characteristics. *Journal of Forensic Nursing*, 12(4), 151-159. doi:10.1097/JFN.0000000000000124
- Honor, G., & Fischer, B. A. (2016). Child Sexual Abuse Revictimization: Child Demographics, Familial Psychosocial Factors, and Sexual Abuse Case Characteristics. *J Forensic Nurs*, 12(4), 151-159. doi:10.1097/JFN.0000000000000124
- Kerns, C. M., Newschaffer, C. J., Berkowitz, S., & Lee, B. K. (2017). Brief Report: Examining the Association of Autism and Adverse Childhood Experiences in the National Survey of Children's Health: The Important Role of Income and Co-occurring Mental Health Conditions. *Journal of Autism and Developmental Disorders*, 47(7), 2275-2281. doi:http://dx.doi.org/10.1007/s10803-017-3111-7

- Kerns, C. M., Newschaffer, C. J., & Berkowitz, S. J. (2015). Traumatic Childhood Events and Autism Spectrum Disorder. *J Autism Dev Disord*, 45(11), 3475-3486.
doi:10.1007/s10803-015-2392-y
- Koetting, C. (2016). Trauma-Informed Care: Helping Patients with a Painful Past. *J Christ Nurs*, 33(4), 206-213. doi:10.1097/cnj.0000000000000315
- Kohane, I. S., McMurry, A., Weber, G., MacFadden, D., Rappaport, L., Kunkel, L., . . . Churchill, S. (2012). The Co-Morbidity Burden of Children and Young Adults with Autism Spectrum Disorders. *PLoS ONE*, 7(4), 1-7. doi:10.1371/journal.pone.0033224
- Lewis-O'Connor, A. (2015). Engaging the voice of patients affected by gender-based violence: informing practice and policy. *Journal of Forensic Nursing*, 11(4), 240-249.
- Low, N. C., Dugas, E., O'Loughlin, E., Rodriguez, D., Contreras, G., Chaiton, M., & O'Loughlin, J. (2012). Common stressful life events and difficulties are associated with mental health symptoms and substance use in young adolescents. *BMC Psychiatry*, 12(1), 116. doi:10.1186/1471-244x-12-116
- Maclean, M. J., Sims, S., Bower, C., Leonard, H., Stanley, F. J., & O'Donnell, M. (2017). Maltreatment Risk Among Children With Disabilities. *Pediatrics*, 139(4).
doi:10.1542/peds.2016-1817
- Masarik, A. S., & Conger, R. D. (2017). Stress and child development: a review of the Family Stress Model. *Current Opinion in Psychology*, 13, 85-90.
doi:https://doi.org/10.1016/j.copsyc.2016.05.008
- Promotion, O. o. D. P. a. H. (2018). Healthy People 2020 The social determinants of health. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>

- Sirreyah, R., & Lawton, R., Gardner P., and Armitage, G. (2012). Reviewing studies with diverse designs: the development and evaluation of a new tool. *Journal of Evaluation in Clinical Practice*, 18, 746 - 752. doi:10.1111/j.1365-2753.2011.01662.x
- Sullivan, P. (2009). Violence Exposure Among Children with Disabilities. *Clinical Child & Family Psychology Review*, 12(2), 196-216. doi:10.1007/s10567-009-0056-1
- Sullivan, P., & Knutson, J. F. (1998). The Association Between Child Maltreatment and Disabilities in a Hospital-Based Epidemiological Study. *Child Abuse & Neglect*, 22(4), 271-288. doi:https://doi.org/10.1016/S0145-2134(97)00175-0
- Thompson, C., Cullum, N., McCaughan, D., Sheldon, T., & Raynor, P. (2004). Nurses, information use, and clinical decision making—the real world potential for evidence-based decisions in nursing. *Evidence Based Nursing*, 7(3), 68-72. doi:10.1136/ebn.7.3.68
- Walker, M., & McPherson, A. C. (2018). Weight management services for an underserved population: a rapid review of the literature. *Disabil Rehabil*, 1-9. doi:10.1080/09638288.2018.1497713
- Wang, J., Gao, Y., Kwok, H. H. M., Huang, W. Y. J., Li, S., & Li, L. (2018). Children with Intellectual Disability Are Vulnerable to Overweight and Obesity: A Cross-Sectional Study among Chinese Children. *Child Obes*, 14(5), 316-326. doi:10.1089/chi.2018.0015
- Whittemore, R., & Knafl, K. (2005). The integrative review: updated methodology. *Methodological Issues in Nursing Research*, 52(5), 546-553.
- World Health Organization. (2013). Autism spectrum disorders and other developmental disorders. Retrieved from Geneva Switerland:
- Xie, L., Gelfand, A., Delclos, G. L., Atem, F. D., Kohl, H. W., III, & Messiah, S. E. (2020). Estimated Prevalence of Asthma in US Children With Developmental Disabilities.

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Table 1.
Quantitative Research Results (n=5)

Author	Purpose and Design	Sample	Findings	Limitations	Data Evaluation
Berg, Shiu, Acharya, Stolbach, Msall, 2016.	Generate new knowledge about the prevalence of cumulative household and community-level adversities experienced by children with Autism Spectrum Disorder (ASD) and typically developing peers using the ACEs scale Secondary data analysis using Data from the 2011-12 National Survey of Child health	1,611 US children ages 3-17 identified as having an ASD-related diagnosis. Average age was 10.4 years, of which 82% were males. 61.3% White, 18.8% Hispanic, 10.6% Black, and 9.2% other/multiracial	Children with ASD were exposed to a higher # of cumulative ACEs. 50.9% of children with ASD exposed to at least 1 ACE, w/ 10.2% experiencing between 4 and 9 ACEs. In contrast, 54.3% of children w/o developmental disabilities were exposed to 0 ACEs, with only 5.1% experiencing 4 or more ACEs. Significantly higher exposures ACEs in ASD group were income insufficiency, neighborhood violence, parental divorce, mental illness and substance abuse.	Is a secondary data analysis and data analyzed drawn from a cross-sectional population based survey data so difficulty establishing causality. Health outcomes are defined as general physical and behavioral health outcomes but not defined. Terminology used ASD specifically then calls them developmental disabilities. Age range is appropriate (3-17)	Aim: 1, 3 Score 62% Establishes clear statistical relationship between ACEs and ASD regarding health outcomes QUANT Categories: a, b,d
Emerson & Brigham, 2014	Increase understanding of the potential role of social determinants of	Identified as developmental delay (n=2236), identified w/o developmental	Families supporting children with developmental delay were	Survey questions to get data of unknown psychometric	Aim: 1, 3 62% score – good quality

	<p>poorer health in people with intellectual disabilities by 1- describing risk of young children with and w/o developmental delay to upstream and downstream (includes adverse life events) SDOH; 2- estimate the extent to which increased risk of exposure to significant harm and behavioral problems for children with developmental delay may be attributed to differential between-group rates of exposure to SDOH; 3- determine extent downstream determinants mediate the relationship between low SEP and the 2 health-related outcomes. Data reported based on secondary analysis of needs analysis data collected in 3 PCT in England.</p>	<p>delay (n=43,787). Households with children under age 5 in PCT A&B, and under age 3 in PCT C.</p>	<p>significantly (p <0.05) more likely to be exposed to all but 1 potential SDOH. Risk of poorer health outcomes for children with DD attributable to differential between-group rates of exposure to SDOH poorer. Some of the variability is seen in between group differences model therefore the risk of DD being associated with poor HO is reduced. In DD Parenting play significant role in partially mediating the effects of low SEP. Other factors such as violence in the family and parental mental health partially mediated effects of low SEP for the 2 Hos.</p>	<p>properties & cross sectional design. No formal assessment of inter-rater reliability was done. Using children diagnosed with term developmental delay captures a mix of children with different levels of severity. Thus can't be fully generalized to any group with developmental delay.</p>	<p>SDOH include ACES but also other factors to consider under SDOH.</p> <p>QUANT</p> <p>Categories: a, b, c, d</p>
Author	Purpose & Design	Sample	Findings	Limitations	Data Evaluation

<p>Hatton & Emerson, 2004</p>	<p>Secondary analysis using the Office for National Statistics (ONS) Survey looking at relationship between adverse life events and child psychopathology in children with intellectual disabilities which is any mental disorder classified in ICD-10 and DSM-IV through use of DAWBA</p>	<p>264 adolescents and children aged 5-15 yrs identified as having intellectual disabilities by operational definition in this study. 72% male, 94% white, 3% Black, 2% South Asian, 2% other. Children without intellectual disabilities (n= 10,040).</p>	<p>Diagnosed psychiatric disorders more prevalent in children with intellectual disabilities. Overall children with intellectual disabilities experiences more adverse life than non-disabled peers, parental separation, serious illness requiring hospitalization , death of a pet, parental financial crisis. Logistic regression model showed family poverty, child intellectual disabilities, older age child significantly associated w/ child experiences of any adverse life event. Among children with intellectual disabilities parental separation, parental involvement with law enforcement death of close friend correlated to higher</p>	<p>Statistical analysis used $p < 0.05$ since sample # was small needing larger CIs reduced power of analysis. Definition of intellectual disability operationalized by variables not designed for this analysis. Adverse life events were through parent recall and independent adverse life events could have been a combination of same event. Retrospective nature of life events data & cross-sectional data mean that casual relationships cannot be inferred.</p>	<p>Aims: 1,3 Score: 57%</p> <p>Good quality</p> <p>Data establish importance of adverse life events in children with intellectual disabilities</p> <p>QUANT</p> <p>Categories: a, b, c,</p>
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			prevalence of psych disorder		
Hornor & Fischer, 2016	Describe child demographics, familial psychosocial factors and SA case characteristics in children experiencing SA revictimization before age 18 compared to those not experiencing revictimization. Retrospective chart review	N= 98 children who presented to CAC for second or more sexual abuse assessment over a 12-month period. One assessment group n= 100. Total N = 198, 78.3% female, 21.7% male. 72.2 % white, 23.2% African American, 4.5% Hispanic. 22.2% had diagnosis of developmental delay/disabilities . 25% of sample had a mental health diagnosis.	Children in the revictimization group were younger and more likely have a development delay, have a mental health diagnosis. Families in the revictimization group were more likely to receive public assistance & voice financial concerns; more likely to report previous involvement with LE and CPS, and drug/alcohol concerns, parental mental health concerns and domestic violence were found more frequently in revictim group	Retrospective chart review like a secondary data analysis and information limited to what is in patient chart. Small sample with limited generalizability to larger populations. Victimization based on child report; 1 assessment victims could have been assaulted prior and not reported it.	Aims: 1, 2, 3 Score 50% - good quality Ties revictimization to developmental delays, thus increasing risk and coincidentally found familial characteristics of adverse life events. If psych mental diagnosis is a health outcomes, this ties all together. QUANT Categories, b, c, d
Kerns, Newschaffer, Berkowitz, and Lee, 2017	Elucidate the role of poverty and child clinical characteristics due to the increased adversity level reported for ASD children in the National Survey of Children's Health. This can	From NSCH (N= 65,680) excluded 3253 due to lack of needed inclusion criteria, N= 62,067 of which N= 1,280 with ASD. Children with ASD more likely to be male, white non-Hispanic, in family without 2	Children with ASD more likely to report ≥ 2 ACEs and ≥ 4 ACEs. Children w/ ASD had significantly higher rates of intellectual disability, anxiety, depression,	Cross sectional study: inability to assess casual relationships. All data comes from self-report data.	Aims, 1, 3. Score 52% Good quality QUANT Brings together intellectual disability with increased risk of ACEs and attenuated by

	<p>help understanding of relationship of ASD and ACEs. Secondary data analysis</p>	<p>parents, and income \geq 200% federal poverty level (FPL)</p>	<p>and behavioral problems than non ASD. ASD associated with higher risk of having \geq 2 ACEs in lower income families after adjustment for sex, age, and family structure. Evidence that ASD and more ACEs is moderated by family income and contingent on co-occurring mental health conditions in ASD.</p>		<p>SEP and co-morbid mental health conditions in ASD population</p> <p>Categories: a, b, c, d</p>
<p>Note:</p>	<p>Aims of the review: Evaluate the relationship discussed in the current literature 1 - r/t adverse life events and HO in children w/cognitive disabilities; 2 – r/t child maltreatment and HO in children w/ cognitive disabilities; 3 – identify opportunities for future nursing research to improve HO in children w/cognitive disabilities</p>	<p>Score on QSDDAT = %</p>	<p>QUANT = quantitative study</p>	<p>Categories addressed in synthesis: a – data set b – parental difficulties c – co-morbid mental health issues d – health outcomes</p>	

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Examining the Interaction of Adverse Childhood Events, Dental Issues, Asthma and Autism

Abstract

Purpose: Adverse childhood events (ACEs) have a profound and long-term effect on the health outcomes of many children and adults. However, few studies have focused on specific ACEs and health outcomes in children with autism spectrum disorder (ASD). The aim of this study was to investigate if ASD moderated the relationship between ACEs and specific health outcomes in children who had been the subject of a child welfare system report.

Design and Methods: Using the second National Survey of Child and Adolescent Well-Being (NSCAW II), a secondary analysis was performed on a sample of 80 children with diagnosed autism and 5,698 children without autism. ACEs score criteria included physical abuse, sexual abuse, neglect, psychological aggression, domestic violence, parental substance abuse and mental health. Health outcome variables included dental issues and asthma. Child characteristics of age, gender, race, and poverty level were also included in the analysis.

Results: Chi-square analysis indicated a significantly higher percentage of children with ASD whose parents reported psychological abuse compared to children without autism $\chi^2 (28.03, df = 74, F = 11.08)$. Children with ASD have a noteworthy number of ACEs compared to children without autism ($p = 0.00$). Logistic regression found having an ACE increased the odds of having dental issues 2.80 times compared to not having an ACE (odds ratio [OR] = 2.8 standard error [SE] = 1.27, $p < 0.5$).

Conclusions: A diagnosis of ASD does not appear to moderate dental issues or asthma in this sample of children. Children with ASD are at risk of harmful and chronic health outcomes due to ACEs.

Practice Implications: All healthcare providers should include ACE screening assessing children with ASD. If completed early and regularly, preventative measures may be employed that help support families and may avoid entrance into the child welfare system.

Introduction

The American Psychiatric Association's Diagnostic and Statistical Manual Fifth Edition (DSM 5) provided standardized criteria to help diagnose autism spectrum disorder (ASD). Diagnostic criteria include persistent deficits in social communication and interaction plus at least two of four types of restricted, repetitive behaviors (American Psychological Association (APA), 2013). Severity of the disorder is based on social communication impairments and restricted, repetitive patterns of behavior. The World Health Organization (2013) states that neurodevelopmental impairments in communication, social interaction and unusual ways of perceiving and processing information can seriously hinder daily functioning of people with ASD because they have varying levels of abilities. Many children with ASD have profound functional impairments as the defining symptoms compared to other neurodevelopmental diagnoses such as attention deficit hyperactivity disorder (ADHD), considered to be a learning disability. With impairments such as those found in ASD co-occur, parenting children with ASD brings many challenges. Additionally, if the child with ASD has co-occurring medical issues, the parenting relationship becomes substantially more complicated especially if parents have their own personal and adverse challenges.

Studies also reveal children with ASD have higher rates of co-occurring medical and psychiatric illnesses compared to the general pediatric population (Croen et al., 2015). Research from the National Survey of Children's Health (The Maternal Child Health Bureau of the US Department of Health and Human Services, 2011) reported that co-morbid poor oral health was

more likely to be reported by parents of children with ASD compared to those without ASD (Kopycka-Kedzierawski & Auinger, 2008). A systematic review of 39 cross-sectional quantitative studies and seven prospective quantitative studies reported a strong association between periodontal infections and diabetes, heart disease, and stroke creating other possible reasons for harmful and chronic health outcomes in children with ASD (US Department of Health and Human Services, 2000).

Concomitantly, children with ASD have higher rates of exposure to adverse childhood events, or ACEs, also known to impair health over time. These adversities include child maltreatment and abuses. Studies show that children with ASD have a higher risk of multiple ACEs in comparison with typically developing peers (Berg et al., 2016). Factors such as child age, ASD severity level, race, gender, status of parental health and low socioeconomic status help predict higher ACE numbers in children with ASD (Berg et al., 2016; Crouch et al., 2019; Hoover & Kaufman, 2018; Kerns et al., 2017; Kerns et al., 2015). Children with ACEs experience more unmet dental, vision and mental healthcare needs and children with disabilities such as ASD experience more ACEs than their non-disabled peers (Berg, Shiu, et al., 2018). Multidimensional factors of disabilities and ACEs are all believed to potentially lay the foundation for harmful and chronic but avoidable health outcomes in this population.

Research undertaken in the general population shows that exposure to ACEs has a detrimental impact on health and well-being across the life course (Chartier & Walker, 2010; Dube et al., 2010; Felitti, 2002; Felitti & Anda, 1998). According to Felitti and colleagues (1998), ACEs include physical and sexual abuses, emotional abuse, neglect intimate partner violence (IPV), mother treated violently, substance misuse in the household, mental illness within a household, parental separation or divorce, and incarcerated household member. The

presence of one or several ACEs created a cumulative environmental adversity resulting in poor health outcomes affecting neurobiological, social, and psychological pathways through which these adversities impair health (Emerson, 2013). Children with disabilities are more vulnerable than children without disabilities to abuse and neglect (Emerson & Brigham, 2015; Sullivan & Knutson, 1998). Additionally, they have a higher rate of abuse along with adverse health outcomes such as increased dental issues and a higher prevalence of asthma than children without disabilities (Bolduc et al., 2011; Kohane et al., 2012; Maclean et al., 2017; Sullivan, 2009).

There is a lack of research in the nursing literature about the effects of ACEs on children with ASD. Addressing this gap is important considering the role nurses play in the treatment of children in various healthcare delivery systems requiring nurses to be knowledgeable about their care. Additionally, because children with ASD and other disabilities experience maltreatment more frequently than their peers without disability, have a multiple number of ACEs and increased vulnerability to poor health outcomes, it is essential for all healthcare providers to understand the interplay of how ACEs increase health risk and alter health outcomes (Berg, Acharya, et al., 2018; Emerson & Brigham, 2015; Kerns et al., 2017).

While the literature shows that children with disabilities have poorer health outcomes and experience higher rates of maltreatment than peers without disability (Emerson & Brigham, 2015; Emerson & Hatton, 2007; Kohane et al., 2012; Maclean et al., 2017) the relationship between ACEs and ASD is not systematically documented. Consequently, there is a lack of evidence-based clinical health interventions for healthcare providers to utilize when managing health promotion and health outcomes for children with ASD who have experienced adverse life events. Because these children present with complex healthcare needs, providers need further

understanding of what possible adverse childhood experiences may affect the overall health in this population. Once identified, providers may be able to alleviate or eliminate the risk factors resulting in poor health outcomes such as asthma and dental issues.

Methods

Study Aim and Study Questions

The aim of this study was to determine if the presence of diagnosed ASD is a moderating factor that impacts the strength of the relationship between ACEs and specific health outcomes in children reported to the child welfare system. The overarching research question was: Can specific adverse life events (physical abuse, sexual abuse, neglect, emotional abuse, psychological abuse, parental substance abuse and parental mental health) in the presence of ASD increase the likelihood of specific health outcomes (i.e., dental issues or asthma) in a population of children who have been the subject of a child welfare report? Therefore, analysis sought to determine the following:

1. What is the presence of asthma and dental issues in children with diagnosed ASD and children without ASD?
2. What is the presence of ACEs (i.e., physical abuse, sexual abuse, emotional abuse, neglect, psychological aggression, domestic violence, drug, and alcohol use (caregiver substance) and mental health issues in children with ASD and without ASD?
3. Does ASD moderate the relationship between the presence of ACE criteria and specific health outcomes in children who have been the subject of a child welfare system report?

The Second National Survey of Child and Adolescent Well-Being (NSCAW II) sampled children from February 2008 – April 2009, and was designed to answer fundamental questions about the performance of service needs, and service use of children who encountered the child welfare system due to an abuse allegation (Dowd et al., 2013). The survey is sponsored by the Office of Planning, Research, and Evaluation and the Administration for Child and Family, US Department of Health and Human Services (Ringeisen et al., 2011). The study captures information about abuse and neglect investigations reported to child welfare. Also, information regarding children’s health, mental health, and developmental risk, particularly those children who experienced severe abuse and exposure to violence is collected. Following the NSCAW I, the NSCAW II study was designed to better understand the convergence of the welfare system with service provision to child and families as child maltreatment continues to be a significant public health concern (Dowd et al., 2013).

The NSCAW II is a national probability survey of 5,873 children between the ages of zero and 17.5 years from 83 counties across the United States who encountered the welfare system as a subject of a child maltreatment report. The sample for the database was composed of 5,873 children from 81 of the 92 original NSCAW I Primary Sampling Units (PSUs). The sampling process was conducted over a 15-month period and included children investigated or accessed between February 2008 and April 2009 (Dowd et al., 2013). Children who were members of the same household of a previously selected child (siblings of a previously selected child) were deleted from the sampling file to limit the burden on families by sampling the household only once for the study. The NSCAW II Restricted Use File (RUF) contained data from multiple informants affiliated with each sampled child to get a complete picture of the child (Dolan et al., 2011). Face-to-face interviews were conducted with children, parent, non-parent

adult caregivers (foster caregiver, kin caregiver, group home caregiver) and investigative caseworkers. Both children who remained in the system and those who left the system were studied for the full study period. Children receiving services in their homes and those in out-of-home care were part of the sample (Dowd et al., 2013). Approximately, one half of the sample was male (50.8%). One-fifth (20.6%) of the children were 0 to 2 years old, 22.6% were 3 to 5 years old, 27.4% were 6 to 10 years old and 29.5% were 11 to 17 years old. White children composed 41.5% of the sample, 28.3% were Hispanic, 22.4% were Black and 7.7% described their race/ethnicity as “Other” (Ringeisen et al., 2011). To ensure adequate statistical power, the sample design oversampled infants and cases receiving ongoing services after investigation. Because NSCAW II included oversampling to provide enough cases for analysis in specific categories, statistical weights are applied when performing data analysis. The RUF contains the stratum and PSU identified, named STRATUM and NSCAWPSU, which are needed to obtain standard error that correct for the NSCAW sample design.

Inclusion and Exclusion Criteria

For this secondary analysis, all children ages 0-17.5 years who resided with their biological families, adoptive parents, or lived with a primary caregiver met inclusion criteria. If children were in out-of-home placement such as foster placement, they were excluded since caregivers in these situations tend to have little knowledge about the medical history of the child in their care. For comparison, children identified by caregiver report as having ASD were included.

Sample

The sample in this data analysis was drawn from the complete data set. Univariate analysis containing the demographics of the entire sample of children living with a caregiver are

found in Table 1. The sample was composed of children with ASD ($n = 80$), and children without ASD ($n = 5698$).

Instruments

All variables of interest were derived from the caregiver instruments used in the original survey. Because ACEs are defined as potentially traumatic events that occur in childhood, physical abuse, sexual abuse, neglect, psychological aggression, domestic violence, parental substance abuse and mental health were the specific ACEs of interest for this study. These events are measured in the NSCAW II through the *Parent-Child Conflict Tactics Scale*, the *Reduced Conflicts Tactics Scale 2 for Domestic Violence*, the *Short Form Health Survey for Mental Health*, the *Alcohol Use Disorders Identification Test*, and the *Drug Use Questionnaire*.

The Parent-Child Conflict Tactics Scale

The Parent-Child Conflict Tactics Scale (CTS-PC) (Straus et al., 1996) was developed to assess the uses of discipline, and range from time out to burning a child. This instrument is based on conflict theory which purports that the use of discipline is a common parent action to deal with conflicts with children. However, physical assault is not considered a disciplinary conflict action. The CTS-PC used a Likert-type scale to ask about incidence of violence in the last 12 months and extent to which a parent has carried out specific acts of physical and psychological aggression (Straus et al., 1998). In the NSCAW study, internal consistency is good for the caregiver report with total Cronbach's alpha of 0.92. Non-violent Discipline ($\alpha = 0.77$), Psychological Aggression ($\alpha = 0.66$) and Physical Assault ($\alpha = 0.95$) are the three subscales that comprise the entire scale. The Physical Assault scale can be subdivided into three categories: minor physical assault (corporal punishment), severe physical assault, and very severe physical assault. Questions within these subscales also provided information on Neglect ($\alpha = 0.39$) and

Sexual Abuse ($\alpha = 0.58$). The NSCAW II contained a recoding for the frequency of violence in the past year, incidence of violence in the past year, and the incidence of violence ever.

Frequency data however is never used for this variable due to its numerical skewness.

Physical Assault/Physical Abuse

For this analysis the severe physical assault score for the past year was used to represent the physical abuse score in the sample and comparison population (Office of Planning, Research, and Evaluation, NSCAW II Appendix Vol. III. 2013). The data was calculated categorically from the following four questions: 1) how many times the parent/caregiver hit/kick child; 2) number of times parent/other hit child on body; 3) number of times parent/other threw down child; and 4) number of times parent/other slapped child.

Psychological Aggression

Psychological aggression data was obtained in the NSCAW II through a calculation of a subscale of the CTS-PC. The subscale was obtained from a positive answer to any of the following: 1) shouted/yelled/screamed at child; 2) sworn/cursed at child; 3) said child will be sent away/kicked out; 4) threatened to hit but did not do it; 5) called child dumb/lazy/other name. Data for this variable is the result of any occurrence of psychological aggression described in the previous 12 months from the caregiver data.

Nonviolent Discipline (Emotional Abuse)

Emotional abuse data was obtained in the NSCAW II from a question in the CTS-PC which asked the caregiver how many times they were so caught up with problems that they were not able to show or tell their child that they loved him/her in the past 12 months. This question is a part of the subscale for the other child neglect variables.

Sexual abuse

Sexual abuse frequency was measured through the CTS-PC subscale for sexual abuse. In the NSCAW II data was recorded on any frequency of sexual abuse in the last year. Hence data for this variable is representative of one or more occurrences of caregiver knowledge regarding sexual abuse of the child within the previous 12 months. The data was calculated categorically from the following three questions: 1) whether the child has been touched in a sexual way by an adult or older child in a way that she/he did not want to be touched in that way; 2) whether the child has been forced to touch an adult or older child in another way including anyone who was member of the family or anyone outside the family; and 3) whether the child has been forced by an adult or older child including anyone who was a member of the family to have sex.

Neglect

Data for this variable is the result of any occurrence of neglect in the previous 12 months. The data was calculated categorically from the following five questions: 1) leaving the child at home alone when the caregiver thought an adult should be with them; 2) being so caught up with his or her own problems that caregiver was unable to tell the child that he or she loved the child; 3) not being able to make sure the child got the food he or she needed; and 5) being so drunk or high that the caregiver had a problem taking care of his or her child.

Reduced Conflicts Tactics Scale 2 – Domestic Violence

Domestic violence data was obtained from the NSCAW II from a calculated subscale derived from questions in the *Reduced Conflicts Tactics Scale 2 – Domestic Violence Tool* ($\alpha = 0.86$). The NSCAW II variable data is reflective of any incidence of violence whether minor or severe, and any incidence of violence in the past year. The variable derives from data questions which asked caregivers; 1) any minor assault in the past year; and 2) any severe assault in the

past year. If the sum of those two questions was greater than zero, the result was a positive score which was recorded as the domestic violence score.

Alcohol Use Disorders Identification Test (AUDIT)

The AUDIT is a 10-item questionnaire designed to aid in the early recognition of caregivers who consume alcohol in ways that are possibly or currently harmful to health ($\alpha = 0.96$) (Higgins-Biddle & Babor, 2018). For the AUDIT, score of five or greater were considered the cut point for identifying at risk drinkers.

The Drug Use Questionnaire (DAST-20)

The DAST is a brief instrument for clinical screening and treatment evaluation ($\alpha = 0.93$) (Skinner, 1982). For the DAST, a score of six or greater was considered the cut point for identifying at risk drug-related problems at an intermediate level meeting DSM 5 criteria for a caregiver drug-related problem (Dowd et al., 2013).

The Short Form Health Survey (SF-12)

Mental health data was obtained from the NSCAW II using the *Short Form Health Survey (SF-12)* (Ware, et al., 1998). NSCAW reports that test-retest reliability for the mental health section was 0.76. Data to test the validity of the SF-12 came from the National Science Foundation Mental Health and Medical Outcomes study, an observational study of health outcomes for patients in chronic conditions. In four validity tests involving mental health criteria, relative validity estimates ranged from 0.93 to 0.98 (Ware et al., 1998). In NSCAW, internal consistency for the mental health measure was $\alpha = 0.79$ (U.S. Department of Health and Human Services, 2011). Data used for this variable is from the standardized mental health score which was derived by NSCAW II researchers using a formula established by the original developers. Items for this variable include caregiver questions asking about occurrence of emotional

problems which resulted in accomplishing less and doing less regarding activities of work and activities both inside and outside of the household. The NSCAW II considered a score positive for mental health if calculated two standard deviations below the mean (Dolan et al., 2011).

Outcome Variables

Dental Issues

Data for this variable was obtained from the NSCAW II in which caregivers reported in the affirmative that their child had dental problems. This variable was stratified within the sample population to determine the number of children with ASD and without ASD whose caregivers reported they currently had dental problems.

Asthma

Data for this variable was obtained from the NSCAW II in which caregivers reported in the affirmative that their child has asthma. Similarly, the variable was stratified within the sample population to determine the number of children whose caregiver reported both asthma and ASD and the number of children without ASD whose caregiver reported they currently had asthma.

Moderating Variable

Autism/ASD

Data for this variable was obtained from the NSCAW II in which caregivers reported in the affirmative that their child currently has autism or ASD.

Co-Variates

Child Characteristics

A child's age (continuous in years) race, and gender were reported by structured interview with the current caregiver obtained in the NSCAW II.

Family Poverty

Family income and household size were reported by caregivers. NSCAW II calculated poverty by calculating the family's income-to-needs ratio. This estimate is calculated by dividing family income by its' corresponding poverty threshold in 2009. Poverty threshold is the minimal level of income established by the US Census Bureau and it varies by family size. It is based on the money available for the minimally accepted amounts of food. The data was divided into four categories: <50%, 50-100%, 100-200% and > 200% below the poverty line.

Statistical Analysis

All analyses were performed using STATA Statistical Software Release Version 16.1. Software such as STATA automatically provides test that analyze appropriate tests of association for survey data. The NSCAW II complex sampling design necessitated use of specific STATA survey (svy) commands to obtain unbiased estimates of the population parameters (Dowd et al., 2013). A weighting formula was applied to the data set prior to tabulating frequencies of each ACE variable, outcome variables, and co-variates. The RUF PSU design requires that when using STATA, the randomized sampling cluster design use the STRATUM and PSU identified, named STRATUM and NSCAWPSU, which are needed to obtain standard errors that correct for the NSCAW II sampling design (Dowd et al., 2013).

Additionally, analysis required use of a Rao-Scott conversion for Pearson chi-square analysis in bivariate contingency tables. The STATA software makes this correction. Running a bivariate table with weight proportion or percent distributions in software that does not correct for the stratified clustered sample design found in NSCAW II does not produce correct tests of association (Rao & Scott, 1981, 1984).

To address the first research question, what is the presence of asthma and dental issues in children with ASD and children without ASD, a bivariate contingency table was created using the Pearson χ^2 test. To account for the complex survey design, χ^2 statistics were converted to a F statistic with noninteger degrees of freedom using a second-order Rao and Scott correction.

To answer the second question, what is the presence of the ACEs of physical abuse, sexual abuse, emotional abuse, neglect, psychological aggression, domestic violence, drug, and alcohol (substance abuse of caregiver) and mental health issues in children with ASD and in children without ASD, bivariate contingency tables using the Pearson χ^2 test were created. As previously stated, these χ^2 statistics were converted to F statistics with noninteger degrees of freedom using a second-order Rao and Scott correction using the stratified sample (Rao & Scott, 1981).

To answer the third question, does ASD moderate the relationship between ACEs and specific health outcomes in children who have been the subject of a child welfare system report, logistic regression was conducted between dependent variables and independent variables. The relationship between dental issues, ASD and ACEs was reviewed. Separate logistic regressions were conducted using either asthma or dental issues as the dependent variable along with independent variables of ASD, ACEs, child age, race, gender, and family poverty levels.

Results

Table 1 shows the demographics of the combined sample of children included in this study. The mean age of the sample was 7.2 years. The percentage of each gender in the entire sample itself comprised of 51% male and 49% female. Race percentages show the sample was 42% White/Non-Hispanic, 27% Hispanic, 22% Black/Non-Hispanic, and one percent Other. The bulk of the sample (97%) lived < 50% or greater below the federal poverty line. Two percent of

the entire sample had a reported ASD diagnosis. This enrollment of ASD participants closely reflects the actual prevalence of ASD in the general population at the time of data collection, which was approximately 1:68.

Regarding ACE variables, Table 1 provides combined data, children with and without ASD, showing physical abuse was 0.2%. Sexual abuse was found to be 4%, and neglect at 25%. Psychological aggression reached 75% of caregivers reporting they engaged in at least one incidence of psychological aggression. Domestic violence showed 25% of caregivers reporting minor and/or severe assault within the past year, while emotional abuse within the past 12 months was reported by 13% of the sample. Substance abuse in caregivers was found to be 11% and mental health issues at 14%.

Table 2 presents the percentages of children with ASD and without ASD when examining individual ACEs of focus. Three significant differences were found. First, a lower percentage of children with ASD, 0.4% were physically abused compared to 5.3% of children without ASD, $\chi^2 (5.69, df = 74, F = 16.88)$. Additionally, only 3.8% of caregivers of children with ASD reported one or more occurrences of emotional abuse compared to 13.2% of caregivers of children without ASD, $\chi^2 (9.45, df = 74, F = 9.05)$. Finally, 95.1% of the caregivers of children with ASD reported they had engaged in an at least one occurrence of psychological aggression in the past 12 month, as compared to 74% of caregivers of children without ASD, $\chi^2 (28.03, df = 74, F = 11.08)$.

Regarding health outcomes variables, Figure 1 shows that 17.5% of children with ASD were identified as having dental issues as compared to only 8% of children without ASD, a statistically significant difference, $\chi^2 (14.16, df = 74, F = 5.03)$. Figure 2 shows that asthma was not a significantly different health outcome between samples, as 13% of children with ASD were

identified as having an asthma diagnosis while 16% of children without ASD were identified having an asthma diagnosis, $\chi^2(0.76, df = 74, F = 0.19)$.

To further analyze the impact of an ACE score on the sample, an ACE score was created by summing the ACE variables. The NSCAW II researchers published a post survey baseline report in which they created ACE scores for the sample using 0 to 4 ACEs categories (Stambaugh et al., 2013). To align to this same 0-4 ACEs categories, after the ACE variables were summed for our sample, a recoding was performed as the initial summing of the ACE variables created ACE scores greater than 4, the cutoff used by the NSCAW II researchers. Once the ACE scores were recoded to match those categories used by NSCAW II researchers in their baseline report (0 to 4 ACEs), a bivariate table analysis of children with ASD and children without ASD using the Pearson χ^2 test was performed. The recoded scores are listed in a pairwise comparison of children with ASD and children without ASD. See Table 3.

To understand the impact of the ACE score data more fully in the sample, ACE scores were then recoded into categories of zero to three ACEs and four or greater ACEs. Results of a multi-site study of children exposed to or at risk of maltreatment showed that by age six, the average ACE score was 1.94 (Flaherty et al., 2013). At an average of 7.2 years, our sample showed 93% of children with ASD had 0 to 3 ACEs, $\chi^2(8.20, df = 74, F = 4.31)$ compared to children without ASD (Table 4). The results presented in Table 5 highlight the fact that 97% of children with ASD in our sample compared to 83.3% of children without ASD, had one or more ACEs, $\chi^2(15.13, df = 74, F = 4.31)$.

Table 6 presents the results of a logistic regression modeling any dental issues in the previous year by ACE, autism and control variables of age, race, gender, and family poverty level. The baseline results in Table 6 show having an ACE increased the odds of having dental

issues 2.7 times compared to not having an ACE (odds ratio [OR] = 2.7, standard error [SE] = 1.27, $p = 0.5$). R^2 for the model was 0.02 and VIF 1.02. Hence when controlling for ACEs in the sample, the relationship between dental issues and ASD disappears. Table 6 also shows that in this regression analysis, having an ACE is associated with three times the odds of having dental issues when controlling for poverty, race, gender, and age of the child (OR = 3.15, SE = 1.47, $p < 0.5$). The model fit probability (Prob > F) was 0.00. In this model, ASD was not significantly related (OR = 1.84, SE = 0.82). Race was not significantly related [(OR = 0.50, SE = 0.16 for Black/Non-Hispanic; OR = 0.97, SE = 0.27 for Hispanic, OR = 0.82, SE 0.13 for race Other)]. Child age was significant in the model (OR = 1.07m, SE = 0.02, $p < .01$); hence every year the child ages, the odds of having dental issues increased by 1.07 times.

Table 7 presents the results of a logistic regression predicting any asthma issues in the previous year by ACE, ASD, and control variables of poverty level, race, gender, and age of the child. This model did not show any relationship between the variables.

Discussion

The study began with wanting to investigate the presence of asthma and dental issues in children with ASD and children without ASD. The presence of dental issues in our sample of children with ASD was significantly higher when compared to children without ASD. Several factors may explain this finding. Children with ASD tend to have oral sensory issues making daily dental care such as brushing and flossing more difficult and require more intervention. As the sample showed a predominant low SES, it may suggest that affording regular dental care may be an issue especially if a child is unable to tolerate a dental exam as seen in many children with ASD.

This finding is of interest to healthcare providers because dental issues can lead to other chronic health issues when not identified early and treated. The fact that this occurs in a population of children with ASD already at risk by being identified in the child welfare system should prompt primary care providers to always include dental screening and dental assessment during well-child visits, particularly in children with ASD. The importance of this finding is an alert to healthcare providers to work to promote not only dental health in this population during patient care interactions, but to also implement an ACE screening.

The prevalence of asthma in our sample of children with ASD was not significant when compared to children without ASD in our sample. Recent studies have identified an elevated diagnosis of asthma in children with ASD (Kotey et al., 2014; Xie et al., 2020). According to the National Center for Health Statistics, 10.5% of children under the age of 18 have been told they have asthma by a doctor or other health professional (CDC National Center for Health Statistics, 2019). Our sample of children with ASD and asthma was 16%, much higher than the national data. This may point to various factors found uniquely in this sample related to low SES, lack of health care follow-up, less access to medications, and even decreased access to doctor visits.

Regarding the second question, the presence of specific ACEs in our sample of children with and without ASD and possible relationships with health outcomes of asthma and dental issues, we discovered a significantly higher percentage of caregivers of children with ASD reporting psychological aggression. This finding may be explained through various factors. The instrument to measure this ACE, the *Conflicts Tactics Scale* (Straus et al., 1998) defines the construct of psychological aggression as a type of parental discipline style. As discipline is a prime component of maintaining child health and safety, children who have more challenging

behaviors may summon increased harsher discipline that can result in negative long term outcomes (Rajyaguru et al., 2019).

Higher rates of psychological aggression as reported by caregivers of children with ASD in our sample versus caregiver of children without ASD may also relate to discipline styles, child behavior and child age. Rajyaguru and colleagues (2019) assessed responses from those who answered items from the *Conflicts Tactics Scale* in the UK Millennium study and then correlated their data with the *Strengths and Difficulties Questionnaire*. Correlations showed negative attributes of behavior effects on the total score in the *Strengths and Difficulties Questionnaire*. After adjusting for the child's initial psychopathology, the model pointed to differential effectiveness of active versus withdrawal discipline approaches with active discipline resulting in internalizing problems of the child by age 11 and decreasing prosocial behavior (Rajyaguru et al., 2019; Wertz, 2019). This study suggests that lower-functioning children with ASD who present at an earlier age with more complex psychopathology are at risk for psychologically aggressive discipline styles. Unfortunately, this type of discipline may even further hinder the child's emotional development by adolescence.

A high rate of psychological aggression in the sample co-exists alongside an extremely low rate of physical abuse. Almost no children with ASD were physically abused. Most research studies have pointed to children with ASD as being more at risk for abuse. Since ASD is considered a spectrum of behaviors, it is conceivable that children with ASD are less likely to be physically abused due to the severity of their cognitive impairment. A recent American Academy of Pediatrics (AAP) updated clinical report on maltreatment of children with disabilities discusses possible reasons for this outcome. The authors concede that the literature that exists today may not be accurate due to limitations of "well-designed research studies with poor

standards of measurement of disability and violence” (Legano et al., 2021). The thrust of the AAP clinical report informs clinicians that more recent research may correlate to type and severity of the child’s disability, hence, their role may be to help caregiver fully understand their child’s capabilities. Level of functioning may be the best factor to review when establishing care practices in pediatric for caregivers of children with disabilities particularly those with ASD.

Helton and Cross (2011) found that when comparing children on the basis of their level of functioning, the highest rates of physical abuse were in children with mild cognitive disabilities and no motor disability. Children with less severe disabilities were more likely to be victims of abuse. The clinical focus for primary care providers should be counseling caregivers about type of discipline appropriate to the child’s level of functioning with the knowledge that harsh discipline negatively affects children emotionally (Legano et al., 2021). For caregivers of children with ASD the spectrum represents a range of risk. Higher-functioning children with ASD may be at increased risk of physical harm than those with a lower-functioning level who are experiencing more psychological aggression from caregivers. The spectrum may create a shielding factor from greater physical harm yet increase risk for psychological harm particularly once the child has been identified in the child welfare system. The results suggest that our sample of children with ASD may be composed of a larger percentage of lower-functioning children in the spectrum which accounts for high psychological aggression and low physical abuse.

The rate of reported emotional abuse was also significantly low. Legano et al., (2021) report that children with ASD who have co-existing psychiatric diagnosis and/or have ADHD as a diagnosis along with ASD have higher rates of emotional abuse. The most likely explanation for the low rate of emotional abuse is that children in our sample may also have lower rates of

co-existing psychiatric diagnoses such as conduct disorders, speech, and language difficulties and or ADHD (Legano et al., 2021).

The third study question was not supported. The results of the logistic regression models showed that in the sample identified, ASD does not moderate the relationship between ACEs and asthma in children who have been subjects of a child welfare report. However, there are some relationships associated with dental issues. In the sample having an ACE increased the odds of having dental issues, yet the model pointed to that relationship disappearing when ASD was introduced. And when dental issues were highlighted in an aggression analysis with ASD, controlling for poverty, race, age of the child and child gender, variables that were significant were ACEs and child age but not ASD.

One finding to highlight and reflect upon is the breakdown of the ACE scoring. More children with ASD had one or more ACEs than children without ASD. This finding shows the importance of accumulated ACEs throughout childhood over time in a sample of children with ASD who were identified by the child welfare system. It is noteworthy that the sample of children with ASD came to the attention of child welfare agencies due to a reported child maltreatment incident. The ACE results suggest that they were more likely to have least 1 ACE and more likely to have at least 3 ACEs, categorizing them as children with a more traumatic past than the children without ASD who entered the child welfare system. For healthcare providers, these results suggest children with ASD who are in the child welfare system are possible at greatest risk of harmful health outcomes.

Finally, the demographics of the sample reinforce prior knowledge that many children who enter the child welfare system because of an allegation of maltreatment also live in poverty. In the NSCAW II database, 72% of the children had public medical insurance defined as

Medicaid and/or State Insurance Health Insurance Plan (Dolan et al., 2011). This context of poverty and increased risk of involvement with child welfare agencies is more succinctly highlighted when noting a study which found that children with Medicaid were more than twice as likely to be reported for possible maltreatment by age five than children not eligible for Medicaid (Fong, 2017). In this study sample, 35% of parents lived 50-100% below the federal poverty line, and 23% lived 100-200% below the federal poverty line. These two groups represent more than 50% of the sample and highlight poverty as a major concept most likely playing a role in the development of adversities which can lead to increased parental stress and family conflict both of which are risk factors child maltreatment and possible child welfare involvement (Fong, 2017).

Practice Implications

This study points out that ACE scores of children with ASD in the child welfare system show there is great risk of harm. This indicates the need for more ACE type screening implementations in primary pediatric settings. When performing a primary care visit for children with ASD, asking caregivers about adverse experiences in their lives and the life of their child is vital to reducing risk of harm. Every pediatric primary care visit should include an ACE screening a regular basis. Primary care providers should also understand that children with ASD should have their plan of care tailored to their level of functioning as those on either end of the behavioral spectrum are at risk for specific types of harm.

Study Strengths

While the NSCAW II database contains data on 5, 873 children, other datasets such as the National Survey of Children's Health (NSCH) which contains approximately 50,000 children and the National Survey of Special Health Care Needs which was integrated into the 2016 NSCH

may have resulted in a larger sample size of children with ASD providing more robust results regarding health outcomes.

Other limitations to consider when evaluating the findings of this study include that ASD was a caregiver report variable. ASD can be diagnosed in a variety of ways but not everyone can be a part of a multi-disciplinary team assessment that includes gold standard diagnostic tools such as the Autism Diagnostic Interview -Revised (ADI-R) and Autism Diagnostic Observation Schedule (ADOS). Also, it not uncommon caregivers of children with ASD may deny the diagnosis. Many times, the response to an intellectual disability diagnosis can result in a period of grieving for a caregiver when realizing that the child they thought they had was not typical. Hence, this variable could be under reported in the sample. Third, these findings can only be generalized to children and caregiver who have been investigated by the child welfare system in the United States. Hence, results may be biased as many children, whether with ASD or not, are victimized but not reported to CPS (Sedlak et al., 2010). Due to their deficits children with ASD are less likely to be believed or be able to verbalize their abuse (Weiss & Fardella, 2018).

Conclusion

These findings suggest that children with ASD are more psychologically abused than their non-disabled peers. They also suggest that children with ASD have multiple ACEs compared to their non-disabled peers. These results should encourage primary care providers and especially nurses to include ACEs screening when caring for children with ASD, knowing that various type of risk exist across the level of functioning. While this study could not tie specific adversities to specific health outcomes, there is a sense of urgency that pediatric providers should be increasing research efforts to determine which adversities increase the risk of long-term health outcomes in this population.

Table 1.*Demographics of the sample of children living with caregivers*

	%	SE
Child age (mean)	7.2 yrs	0.15
Gender		
Male	51	
Female	49	
Race		
Black/Non-Hispanic	22	
White/Non-Hispanic	42	
Hispanic	27	
Other	1	
Has autism	2	0.48
Physical abuse	0.20	0.48
Sexual abuse	4	0.71
Neglect	25	1.30
Psychological aggression	75	1.50
Emotional abuse	13	0.79
Substance abuse	11	0.87
Domestic violence	25	1.50
Mental Health	14	1.08
Dental Issues	8	0.74
Asthma	16	
Federal Poverty Line		
< 50%	26	1.40
50-100%	34	1.20
100-200%	25	1.20
>200%	16	1.20

Figure 1

Percentages of children with dental issues

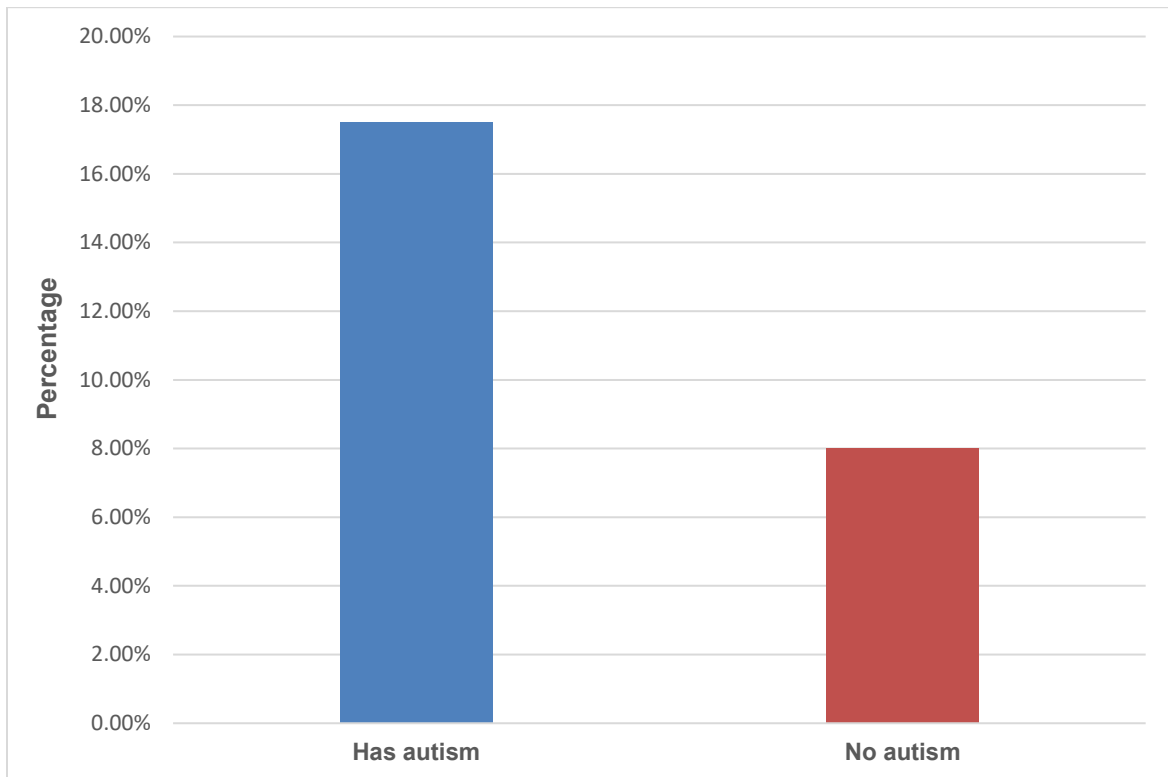


Figure 2.

Percentages of Children with Asthma

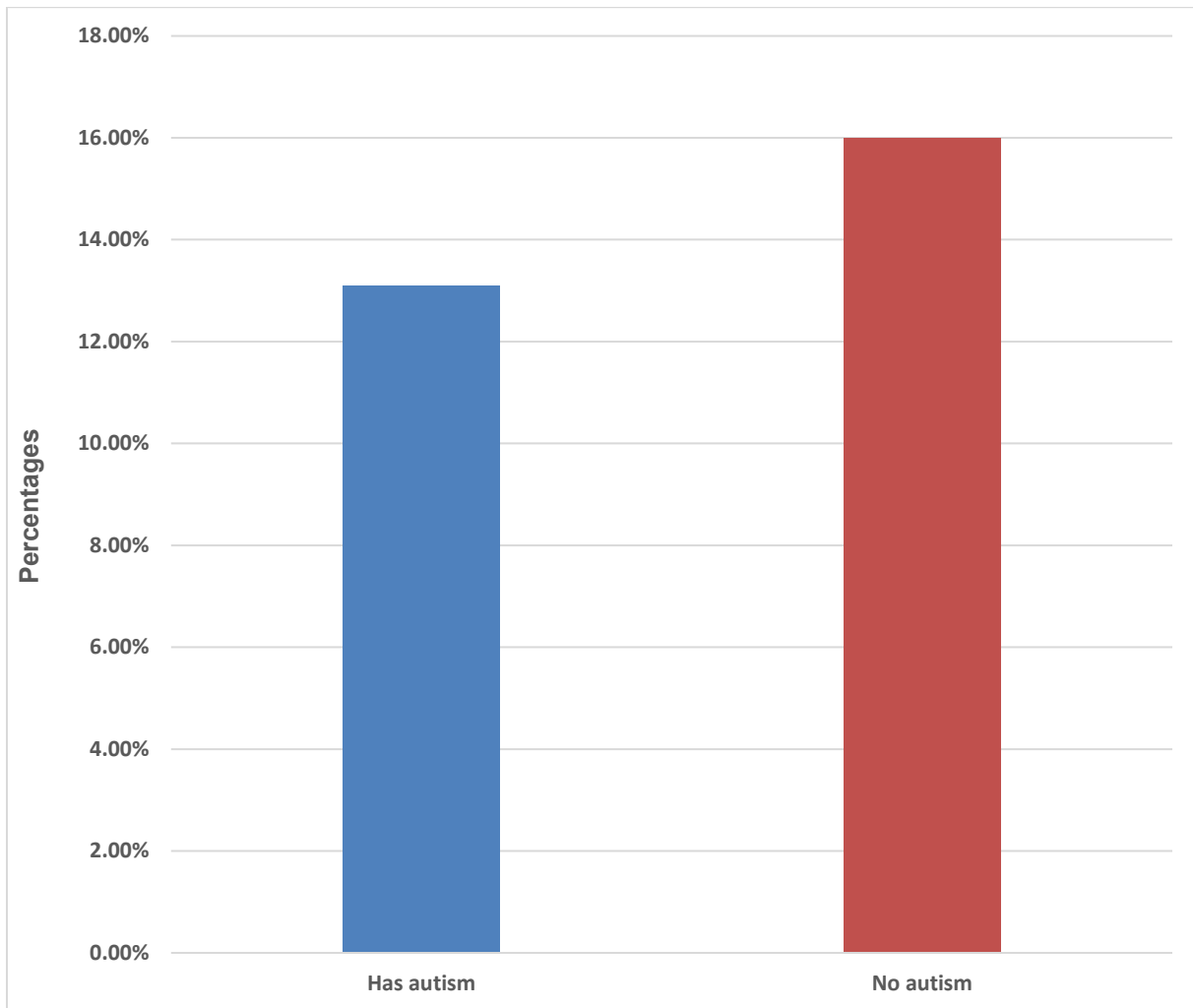


Table 2.
Bivariate Data Analysis

	Children with autism		Children without autism	
	%	SE	%	SE
Physical abuse	0.4	0.3	5*	0.8
Sexual abuse	4	3.1	4	0.7
Neglect	30	9.6	25	1.4
Psychological aggression	95*	3.2	74	1.5
Emotional abuse	3.8	1.7	13*	0.8
Domestic violence	29	11	24	1.6
Substance abuse	10	5.6	11	0.9
Mental Health	11	4.6	14	1.1

*Statistically significant
SE, standard error

Table 3.
ACE Scores

ACE Score	Children with autism (n=52)		Children without autism (n=3561)	
	%	SE	%	SE
0	3	3	17	1.2
1	47	13.1	37	1.6
2	18	6.6	20	1.1
3	28	11.5	14	1
≥ 4	4	1.8	12	1.1

Table 4.
ACE Scores

	Children with autism (n=52)		Children without autism (n=3561)	
	%	SE	%	SE
ACE Score				
0-3	93*	1.7	87	1.1
≥4	4*	1.7	13	1.1

*Statistically significant $p=0.009$

SE standard error

Table 5.
ACE Scores

	Children with autism (n=52)		Children without autism	
	%	SE	%	SE
ACE Score				
0	3*	3	17	1.1
≥1	97*	3	83	1.1

*Statistically significant p=0.04

SE standard error

Table 6.

Logistic regression modeling any dental issues in the previous year by ACE, autism, and controls.

	Unadjusted		Autism status		Controls	
	O.R.	SE	O.R.	SE	O.R.	SE
ACE score	2.7*	1.27	2.7*	1.27	3.15*	1.47
Autism			1.84	0.82	1.76	0.70
Control variables						
Age					1.07**	0.20
Race						
Black/Non-Hispanic					0.50	0.16
Hispanic					0.97	0.27
Other					1.13	0.45
Female					0.82	0.13
Poverty						
50-100%					1.08	0.30
100-200%					0.56	0.16
>200%					0.49	0.16

** p<.01, *p<.05

R² = 0.02; VIF 1.02

Table 7.

Logistic regression modeling any asthma issues in the previous year by ACE, autism, and controls.

	Unadjusted		Autism status		Controls	
	O.R.	SE	O.R.	SE	O.R.	SE
ACE score	1.28	0.27	1.29	0.28	1.21	0.27
Autism			0.76	0.43	0.70	0.37
Control variables						
Age					1.04*	0.16
Race						
Black/Non-Hispanic					1.31	0.31
Hispanic					1.51	0.32
Other					0.91	0.27
Female					0.55*	0.08
Poverty						
50-100%					0.88	0.20
100-200%					0.81	0.18
>200%					0.61	0.22

** p<.01, *p<.05

R² = 0.02; VIF 1.02

References

- American Psychological Association, (APA). (2013). Neurodevelopmental Disorders. In Diagnostic and Statistical Manual of Mental Disorders.
<https://doi.org/10.1176/appi.books.9780890425596.dsm01>
- Berg, K. L., Acharya, K., Shiu, C. S., & Msall, M. E. (2018). Delayed Diagnosis and Treatment Among Children with Autism Who Experience Adversity [journal article]. *J Autism Dev Disord*, 48(1), 45-54. <https://doi.org/10.1007/s10803-017-3294-y>
- Berg, K. L., Shiu, C. S., Acharya, K., Stolbach, B. C., & Msall, M. E. (2016). Disparities in adversity among children with autism spectrum disorder: a population-based study. *Dev Med Child Neurol*, 58(11), 1124-1131. <https://doi.org/10.1111/dmcn.13161>
- Berg, K. L., Shiu, C. S., Feinstein, R. T., Msall, M. E., & Acharya, K. (2018). Adverse Childhood Experiences Are Associated with Unmet Healthcare Needs among Children with Autism Spectrum Disorder. *J Pediatr*, 202, 258-264 e251.
<https://doi.org/10.1016/j.jpeds.2018.07.021>
- Bolduc, M. E., Du Plessis, A. J., Sullivan, N., Khwaja, O. S., Zhang, X., Barnes, K., . . . Limperopoulos, C. (2011). Spectrum of neurodevelopmental disabilities in children with cerebellar malformations. *Dev Med Child Neurol*, 53(5), 409-416.
<https://doi.org/10.1111/j.1469-8749.2011.03929.x>
- Chartier, M. J., & Walker, J. R., & Naimark, B. (2010). Separate and cumulative effects of adverse childhood experiences in predicting adult health and health care utilization. *Child Abuse & Neglect*, 34(6), 454-464.
- Centers for Disease Control. (2021). National Current Asthma Prevalence, 2019.
https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm

- Croen, L. A., Zerbo, O., Qian, Y., Massolo, M. L., Rich, S., Sidney, S., & Kripke, C. (2015). The health status of adults on the autism spectrum. *Autism: The International Journal of Research and Practice*, 19(7), 814-823. <https://doi.org/10.1177/1362361315577517>
- Crouch, E., Probst, J. C., Radcliff, E., Bennett, K. J., & McKinney, S. H. (2019). Prevalence of adverse childhood experiences (ACEs) among US children. *Child Abuse & Neglect*, 92, 209-218. <https://doi.org/10.1016/j.chiabu.2019.04.010>
- Dolan, M., Smith, K., Casanueva, C., & Ringesisen, H. (2011). NSCAWS II Baseline Report: Introduction to NSCAWS II.
- Dowd, K., Dolan, M., K., S., Day, O., Keeney, J., Wheelless, S., & Biemer, P. (2013). National Survey of Child and Adolescent Well-Being II Data File Users Manual.
- Dube, S. R., Cook, M. L., & Edwards, V. J. (2010). Health-related outcomes of adverse childhood experiences in Texas, 2002. *Prev Chronic Dis*, 7(3), A52.
- Emerson, E. (2013). Commentary: Childhood Exposure to Environmental Adversity and the Well-Being of People with Intellectual Disabilities. *Journal of Intellectual Disability Research*, 57(7), 589-600.
- Emerson, E., & Brigham, P. (2015). Exposure of children with developmental delay to social determinants of poor health: cross-sectional case record review study. *Child Care Health Dev*, 41(2), 249-257. <https://doi.org/10.1111/cch.12144>
- Emerson, E., & Hatton, C. (2007). Contribution of socioeconomic position to health inequalities of British children and adolescents with intellectual disabilities. *Am J Ment Retard*, 112(2), 140-150. [https://doi.org/10.1352/0895-8017\(2007\)112\[140:COСПTH\]2.0.CO;2](https://doi.org/10.1352/0895-8017(2007)112[140:COСПTH]2.0.CO;2)
- Felitti. (2002). The relationship between adverse childhood experiences and adult health: Turning gold into lead. *The Permanente Journal*, 6(1), 44-51.

- Felitti, V. J., & Anda, R. F., Nordenberg, D., Williamson, D.E., Spitz, A.M., Edwards, V.,...Marks, J.S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood events (ACE) study. *American Journal of Preventive Medicine*, 14(4), 245-258.
- Flaherty, E. G., Thompson, R., Dubowitz, H., Harvey, E. M., English, D. J., Proctor, L. J., & Runyan, D. K. (2013). Adverse childhood experiences and child health in early adolescence. *Journal of the American Academy of Pediatrics*, 167(7), 622-629.
- Fong, K. (2017). Child welfare involvement and contexts of poverty: The role of parental adversities, social networks, and social services. *Children and Youth Services Review*, 72, 5-13. <https://doi.org/10.1016/j.childyouth.2016.10.011>
- Helton, J. J., & Cross, T. P. (2011). The relationship of child functioning to parental physical assault: linear and curvilinear models. *Child Maltreatment*, 2(16), 126-136. <https://doi.org/10.1542/peds2021-050920>
- Higgins-Biddle, J. C., & Babor, T. F. (2018). A review of the Alcohol Use Disorders Identification Test (AUDIT), AUDIT-C, and USAUDIT for screening in the United States: Past issues and future directions [journal article]. *Am J Drug Alcohol Abuse*, 44(6), 578-586. <https://doi.org/10.1080/00952990.2018.1456545>
- Hoover, D. W., & Kaufman, J. (2018). Adverse childhood experiences in children with autism spectrum disorder. *Curr Opin Psychiatry*, 31(2), 128-132. <https://doi.org/10.1097/YCO.0000000000000390>
- Kerns, C. M., Newschaffer, C. J., Berkowitz, S., & Lee, B. K. (2017). Brief Report: Examining the Association of Autism and Adverse Childhood Experiences in the National Survey of Children's Health: The Important Role of Income and Co-occurring Mental Health

- Conditions. *J Autism Dev Disord*, 47(7), 2275-2281. <https://doi.org/10.1007/s10803-017-3111-7>
- Kerns, C. M., Newschaffer, C. J., & Berkowitz, S. J. (2015). Traumatic Childhood Events and Autism Spectrum Disorder. *J Autism Dev Disord*, 45(11), 3475-3486. <https://doi.org/10.1007/s10803-015-2392-y>
- Kohane, I. S., McMurry, A., Weber, G., MacFadden, D., Rappaport, L., Kunkel, L., . . . Churchill, S. (2012). The co-morbidity burden of children and young adults with autism spectrum disorders [Article]. *PLoS One*, 7(4), e33224. <https://doi.org/10.1371/journal.pone.0033224>
- Kopycka-Kedzierawski, D. T., & Auinger, P. (2008). Dental needs and status of autistic children: results from the National Survey of Children's Health. *Pediatr Dent*, 30(1), 54-58.
- Kotey, S., Ertel, K., & Whitcomb, B. (2014). Co-occurrence of Autism and Asthma in a Nationally-Representative Sample of Children in the United States. *Journal of Autism and Developmental Disorders*, 44(12), 3083-3088. <https://doi.org/10.1007/s10803-014-2174-y>
- Legano, L. A., Desch, L. W., Messner, S. A., Idzerda, S., & Flaherty, E. G. (2021). Maltreatment of Children With Disabilities. *Pediatrics*, 147(5), e2021050920. <https://doi.org/10.1542/peds.2021-050920>
- Maclean, M. J., Sims, S., Bower, C., Leonard, H., Stanley, F. J., & O'Donnell, M. (2017). Maltreatment Risk Among Children With Disabilities. *Pediatrics*, 139(4). <https://doi.org/10.1542/peds.2016-1817>
- Office of Planning, Research, and Evaluation. (2013). NSCAW II Appendix Volume 3.

- Rajyaguru, P., Moran, P., Cordero, M., & Pearson, R. (2019). Disciplinary Parenting Practice and Child Mental Health: Evidence From the UK Millennium Cohort Study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 58(1), 108-116.e102.
<https://doi.org/https://doi.org/10.1016/j.jaac.2018.06.033>
- Rao, J. N. K., & Scott, A. J. (1981). The Analysis of Categorical Data from Complex Sample Surveys: Chi-Squared Tests for Goodness of Fit and Independence in Two-Way Tables. *Journal of the American Statistical Association*, 76(374), 221-230.
<https://doi.org/10.1080/01621459.1981.10477633>
- Rao, J. N. K., & Scott, A. J. (1984). On Chi-Squared Tests for Multiway Contingency Tables with Cell Proportions Estimated from Survey Data. *The Annals of Statistics*, 12(1), 46-60, 15.
- Ringeisen, H., Casanueva, C., Smith, K., Dolan, M., & International, R. (2011). NSCAW II Baseline Report : Children's Services.
 The Materanl Child Health Bureau of the US Department of Health an Human Services. (2011). Fast Facts: 2011/12 National Survey of Children's Health (Data Resource Center, supported by Cooperative Agreement 1-U59-MC06980-01.
- Sedlak, A. J., Mettenburg, J., Basenia, M., Petta, I., McPherson, K., Greene, A., and, & Li, S. (2010). Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): Report to Congress, Executive Summary. Washington, DC
- Skinner, H. A. (1982). The Drug Abuse Screening Test. *Addictive Behaviors*, 7, 363-371.
- Stambaugh, L. F., Ringeisen, H., Casanueva, C., Tueller, S., Smith, K., Dolan, M., & Reigensen, H., Smith, K. E., & & Dolan, M. (2013). Adverse childhood experiences in NSCAW [Research Brief].

- Straus, M. A., Hamby, S. L., Boney-McCoy, S. U. E., & Sugarman, D. B. (1996). The Revised Conflict Tactics Scales (CTS2): Development and Preliminary Psychometric Data. *Journal of Family Issues*, 17(3), 283-316. <https://doi.org/10.1177/019251396017003001>
- Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of Child Maltreatment With the Parent-Child Conflict Tactics Scales: Development and Psychometric Data for a National Sample of American Parents. *Child Abuse & Neglect*, 22(4), 249-270. [https://doi.org/https://doi.org/10.1016/S0145-2134\(97\)00174-9](https://doi.org/https://doi.org/10.1016/S0145-2134(97)00174-9)
- Sullivan, P. (2009). Violence Exposure Among Children with Disabilities [Article]. *Clinical Child & Family Psychology Review*, 12(2), 196-216. <https://doi.org/10.1007/s10567-009-0056-1>
- Sullivan, P., & Knutson, J. F. (1998). The Association Between Child Maltreatment and Disabilities in a Hospital-Based Epidemiological Study. *Child Abuse & Neglect*, 22(4), 271-288. [https://doi.org/https://doi.org/10.1016/S0145-2134\(97\)00175-0](https://doi.org/https://doi.org/10.1016/S0145-2134(97)00175-0)
- U.S. Department of Health and Human Services, Office of Planning, Research and Evaluation. (2011). NSCAW II Final CPS Report. <https://www.acf.hhs.gov/opre/report/nscaw-ii-baseline-report-introduction-nscaw-ii-final-report>
- US Department of Health and Human Services. (2000). Oral health in America: A report of the surgeon general.
- Ware, J. J., & Kosinski, M. K., S.D. (1998). Short Form Health Survey (SF-12). In.
- Weiss, J. A., & Fardella, M. A. (2018). Victimization and Perpetration Experiences of Adults With Autism. *Frontiers in Psychology*, 9(203).

Wertz, J. (2019). Tracing Effects of Parental Discipline on Child Psychopathology: The Devil's in the Detail. *Journal of the American Academy of Child & Adolescent Psychiatry*, 58(1), 20-21. <https://doi.org/10.1016/j.jaac.2018.07.894>

World Health Organization. (2013). Autism spectrum disorders and other developmental disorders.

Xie, L., Gelfand, A., Delclos, G. L., Atem, F. D., Kohl, H. W., 3rd, & Messiah, S. E. (2020). Estimated Prevalence of Asthma in US Children With Developmental Disabilities. *JAMA Netw Open*, 3(6), e207728. <https://doi.org/10.1001/jamanetworkopen.2020.7728>