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Child maltreatment in autism spectrum disorder and intellectual disability: results from a population-based sample

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Background: Children with developmental disabilities are at heightened risk for maltreatment. However, little is known regarding the prevalence of maltreatment among specific groups, such as autism spectrum disorder (ASD) and/or intellectual disability (ID). Information about maltreatment in these groups can aid in the development of supports and prevention strategies for vulnerable children and their families. **Methods:** Using record linkage between the Department of Social Services (DSS) and the Autism and Developmental Disabilities Monitoring (ADDM) network, this study compares the prevalence and characteristics of maltreatment among children with ASD-only (n = 316), ASD and comorbid ID (ASD+ID; n = 291), ID-only (n = 1,280), and controls (n = 3,101). Behavioral correlates of maltreatment are examined. **Results:** Controlling for demographic factors, this study found significantly higher odds of reported and substantiated maltreatment among children with ASD-only (odds ratio = 1.86 for reported, 1.51 for substantiated), ASD+ID (odds ratio = 2.35 for reported, 1.97 for substantiated), and ID-only (odds ratio = 2.45 for reported, 2.49 for substantiated) relative to a population control group, with large effects. In particular, children with ASD+ID and ID-only were between two and three times more likely to experience maltreatment. All groups were more likely to experience physical neglect, and children in the ASD+ID and ID-only groups were more likely to experience all forms of abuse. Children in the ASD-only group were more likely to experience physical abuse. Maltreated children in the ASD-only and ID-only groups experienced more cases of physical abuse and neglect, and were victimized by more perpetrators compared to other maltreated youth. Maltreatment was associated with higher likelihood of aggression, hyperactivity, and tantrums for children with ASD. **Conclusions:** Children with ASD and/or ID are at heightened risk for maltreatment. Empirically-supported assessment and intervention approaches for identifying and addressing traumatic stress related to maltreatment in ASD are urgently needed. **Keywords:** Autism spectrum disorder; intellectual disability; child maltreatment.

Introduction

Children with disabilities are at heightened risk for maltreatment (Maclean et al., 2017; Spencer et al., 2005; Sullivan & Knutson, 2000), a significant public health problem referring to experiences of abuse (physical, sexual, or emotional) and/or neglect that are associated with deleterious outcomes across the lifespan (Cicchetti & Valentino, 2006). However, less is known regarding the prevalence and characteristics of maltreatment among specific developmental disability populations, such as autism spectrum disorder (ASD) and/or intellectual disability (ID). ASD is a neurodevelopmental disorder characterized by social communication difficulties and restricted, repetitive behaviors that is frequently comorbid with ID, which is defined by significant impairments in intellectual and adaptive functioning (American Psychiatric Association, 2013). Given the increasing prevalence of ASD (Baio et al., 2018) and the heightened vulnerability of children with disabilities to experience adversity (Hoover & Kaufman, 2018), empirically-supported practices and services for maltreatment are greatly needed to address the unique needs of children with ASD and/or ID and their families. Thus, it is essential to first understand the extent and characteristics of child maltreatment experiences among children with ASD and/or ID relative to those without.

Prevalence of childhood maltreatment among children with developmental disabilities

Child disability status has been robustly associated with increased rates of maltreatment within the United States and internationally (e.g. Maclean et al., 2017; Spencer et al., 2005; Sullivan & Knutson, 2000). While ID has consistently been associated with heightened maltreatment risk (e.g. Dion, Paquette, Tremblay, Collin-Vézina, & Chabot, 2018; Horner-Johnson & Drum, 2006), evidence is equivocal regarding ASD (see Hoover & Kaufman, 2018; for review). Samples of children with ASD receiving mental health treatment have documented elevated rates of maltreatment (Brenner, Pan, Mazefsky, Smith, & Gabriels, 2017; Mandell, Walrath, Manteuffel, Sgro, & Pinto-Martin, 2005). State wide data has shown that children identified with ASD via school records are more likely to be involved in child protective services (Hall-Lande, Hewitt, Mishra,

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Piescher, & LaLiberte, 2015). Similarly, research linking child services administrative data with Medicaid claims have also found that children with ASD are at elevated risk for foster care involvement (Cidav, Xie, & Mandell, 2018). However, some population-level studies have failed to find that children with ASD are at elevated risk for maltreatment compared to population controls (Maclean et al., 2017; Spencer et al., 2005; Sullivan & Knutson, 2000).

Methodological differences may have contributed to these disparate findings (Urbano, Epstein, Cull, Vehorn, & Warren, 2017). Many of the studies documenting elevated rates of maltreatment among children with ASD have relied on parental report for children receiving mental health treatment, which may not fully represent the wider population of children with ASD (Brenner et al., 2017; Mandell et al., 2005). Most studies using population level data have relied on administrative labels to identify ASD, which may under-identify children with ASD (Spencer et al., 2005; Sullivan & Knutson, 2000). Therefore, examining the prevalence and characteristics of objectively identified maltreatment among a large, population-level sample of children identified with ASD and ID would significantly advance research in this area.

To explicate the unique risk associated with ASD and/or ID, it is essential to adjust for socio-demographic correlates of maltreatment. Poverty is a robust risk factor for child maltreatment (Drake & Jonson-Reid, 2014; Pelton, 2015), and socioeconomic factors underlie ethnic differences in maltreatment risk (Kim & Drake, 2018; Putnam-Hornstein, Needell, King, & Johnson-Motoyama, 2013). Further, low parental education has consistently been associated with heightened maltreatment risk (Sidebotham & Heron, 2006). Given concern that females with ASD may be uniquely vulnerable to abuse and emotional difficulties (Bargiela, Steward, & Mandy, 2016), it is also important to consider child gender in relation to maltreatment risk.

Characteristics of maltreatment among children with developmental disabilities

To comprehensively identify appropriate supports for children with ASD and/or ID who have experienced maltreatment, it is important to understand multiple characteristics of maltreatment. Maltreatment experiences differ across several dimensions, including whether or not they are substantiated (i.e. whether sufficient evidence was found to conclude that the child was abused or neglected). Substantiated and unsubstantiated maltreatment cases do not differ in terms of existing risk factors, recidivism risk, or associated child developmental or behavioral outcomes (e.g. Kohl, Jonson-Reid, & Drake, 2009). Although substantiation is often required for service provision, allegations are the better estimate for maltreatment risk (Kohl et al., 2009). Thus, considering both reports (all investigated cases of maltreatment) and substantiations is important for understanding maltreatment risk and the likelihood of service provision.

Maltreatment experiences also vary by subtype and perpetrator relationship to the victim. Physical neglect is differentiated from abuse, which is typically classified as sexual, physical, or emotional (Barnett, Manly, & Cicchetti, 1993). Perpetrators may vary in closeness to the victim, including whether they are immediate or extended family versus nonfamilial individuals (Sullivan & Knutson, 2000). Research identifying whether children with ASD and/or ID are at particular risk for certain subtypes and perpetrators would enable more targeted prevention and intervention efforts, as most prior research has focused on the presence or absence of maltreatment.

Behavioral correlates of maltreatment

Little is known regarding behavioral correlates of maltreatment exposure in ASD, which is essential for developing assessment and treatment approaches for traumatic stress in ASD (Brenner et al., 2017; Hoover, 2015; Kerns, Newschaffer, & Berkowitz, 2015). Children with ASD and abuse may show heightened behavioral difficulties, such as aggression, self-injury, tantrums, and fears, compared to children with ASD without abuse (Howlin & Clements, 1995). Given that these studies are cross-sectional, it is also possible that these behavioral difficulties increase child risk for maltreatment, rather than being the consequence of abuse or neglect.

The present study aimed to evaluate the odds of experiencing maltreatment among children with ASD and/or ID in comparison to population controls. Differences in broader maltreatment characteristics were examined among all maltreated children with and without ASD and/or ID. In addition, the association between maltreatment and behavioral difficulties was evaluated for children with ASD.

Method

The South Carolina Autism and Developmental Disabilities Monitoring Network (SC ADDM) was one of several networks funded by the Centers for Disease Control and Prevention (CDC) to conduct ASD surveillance in the United States from 2000 to 2012. SC ADDM Network identified 8-year-old children within 23 contiguous counties who met study criteria for ASD via careful review of medical and educational records based on ADDM methodology, which meets ethical guidelines and institutional approval. Beginning in 2000, records were screened at educational and clinical sources, including school districts, Department of Disabilities and Special Needs boards, and academic medical clinics. To comprehensively identify ASD, clinical records were screened if they contained one or more of a variety of diagnostic codes, including ASDs, ID,

ADHD, language delay, or emotional disorders. Educational records were screened when a youth had received any special education services in the past two academic years. Screened records were fully abstracted if they contained behavioral triggers or information that could indicate risk for ASD.

Abstracted records were reviewed by qualified clinicians with expertise in diagnosing ASD. Clinician reviewers determined whether the child met criteria for ASD based on a coding scheme using DSM-IV-TR criteria. ID case status was determined based on the most recent cognitive testing scores for each child (standardized score ≤70). For children with ASD-only or ASD+ID, associated behavioral indicators were coded as present (1) or absent (0), including aggression, hyperactivity, mood disturbances, self-injury, and tantrums. Interrater reliability regarding case status and behavioral indicators was established to standards of 90% agreement. ADDM methodology is an established surveillance strategy with rigorous empirical support, and SC-ADDM has consistently been shown to yield prevalence estimates of ASD that are similar to national data within the entire ADDM network (Braun et al., 2007).

Overall, 4,988 children born in 1992, 1994, 1996, and 1998 were identified for the current study. Children with ASD-only (n = 316), ASD+ID (n = 291), and ID-only (n = 1,280) were identified through SC ADDM. A population control (PC; n = 3,101) comparison sample was randomly selected from state maintained birth certificate records within the study area using a 5:1 frequency match to the ASD groups based on gender and birth year. Child gender (0 = male; 1 = female), ethnicity (African American, Hispanic, Other (including Asian, Pacific Islander, American Indian, Alaska Native, Multiracial), or White), and maternal education (1 = non-high school graduate; 2 = high school graduate; 3 = some college or higher) were also obtained via linked birth certificate records for the entire cohort. Socio-economic status was estimated using standardized same-ethnicity median family income per county. Birth certificate linkages were approved by the SC Department of Health and Environmental Control. Demographic characteristics across groups are presented in Table 1.

Maltreatment classification

To assess lifetime maltreatment experiences within the study cohort, ADDM and birth certificate records for the 4,988 individuals were linked to South Carolina Department of Social Services (DSS) records from 2000 to 2016 via the SC Office of Revenue and Fiscal Affairs (RFA) Health and Demographics Division. Ethical approval for data linkage and retention was obtained via the local institutional review board and agreement to use DSS data stored by SC RFA was approved by SC DSS. Participants ranged in age from 2 to 8 years at the beginning of the study and all participants had turned 18 by the end of the study period. Extracted variables obtained from DSS included maltreatment type, presence of a screened-in alleged report and whether the report was substantiated, and perpetrator relationship.

Maltreatment experiences were classified into established operationalized subtypes according to the Maltreatment Classification System (MCS; Barnett et al., 1993): (a) sexual abuse, (b) physical abuse, (c) emotional abuse, and (d) physical neglect. Primary analyses were conducted on whether an individual had ever experienced a report (0 = none, 1 = at least one report) or substantiation (0 = none; 1 = at least one substantiation) overall, and then by subtype.

For analyses regarding maltreatment characteristics, the number of total cases involving reports and substantiations of each maltreatment category were summed to ascertain the frequency of distinct maltreatment experiences. Counts were arrayed by case number to account for multiple reports from the same incident, such that distinct subtypes from the same case number were only counted once. For example, a score of 0 for physical abuse indicated that zero cases involved a report of physical abuse, whereas a score of 3 indicated that three separate cases involved a report of physical abuse. To assess subtype comorbidity, we evaluated the number of lifetime subtypes experienced from 1 (e.g. physical abuse only) to 4 (physical, sexual, and emotional abuse, and physical neglect).

Perpetrators were categorized based on closeness to the victim as (a) immediate family members in a parental role, (b) extended family members (e.g. aunt, cousin, grandparent), (c) extrafamilial individuals (e.g. babysitter, child care provider, public employee, residential staff), or (d) siblings/other children (e.g. biological sibling, foster child, etc.), in accordance with prior research (Barnett et al., 1993; Sullivan & Knutson, 2000). The total number of cases involving a report or substantiation by each type of perpetrator were summed, such that distinct perpetrators from the same case number were only counted once for each case. For example, a score of 0 for the extrafamilial category indicated that no cases had an extrafamilial individual named as a perpetrator, whereas a score of 3 would indicate that three separate cases had an extrafamilial individual named as a perpetrator. Lastly, the number of distinct perpetrators across all reports was summed; a score of 1 indicated one perpetrator only (e.g. all charges came from mother) whereas higher scores indicated

Table 1 Demographic characteristics across study groups

	Valid n	ASD-only	ASD+ID	ID-only	PC	χ^2 or F
Total N	–	316	291	1,280	3,101	–
Birth year 1992 n	–	69	85	183	788	–
Birth year 1994 n	–	65	74	397	717	–
Birth year 1996 n	–	72	46	330	599	–
Birth year 1998 n	–	110	86	370	997	–
Male gender	4,988	84.5%	77.7%	63.6%	81.0%	165.38[a]
Ethnicity	4,966					286.35[a]
Non-hispanic White		62.1%	42.8%	27.0%	51.3%	–
Non-hispanic African American		30.1%	52.4%	68.2%	43.1%	–
Hispanic		4.5%	3.1%	3.2%	2.7%	–
Non-hispanic Other		3.2%	1.7%	1.7%	2.8%	–
Less than high school education	4,450	18.1%	22.5%	39.8%	23.2%	117.25[a]
Income ($USD)	4,953	24,863	21,103	17,722	22,213	108.91[a]
% with a maltreatment report	4,988	21.2	31.3	39.2	16.1	284.28[a]
% with a maltreatment substantiation	4,988	10.1	16.5	24.7	8.8	203.21[a]

Income represents same-ethnicity median family income per county.
[a]$p < .001$.

multiple perpetrators (e.g. score of 3 might indicate that charges came from mother, father, and aunt).

Analytic strategy

Multinomial logistic regression was utilized to quantify the relationship between group status (ASD-only, ASD+ID, ID-only) and the probability of maltreatment overall and by subtype, relative to the PC group. Gender, ethnicity, maternal education, and income were entered as covariates. To evaluate whether the ASD-only, ASD+ID, and ID-only groups had different maltreatment experiences relative to other maltreated youth in the PC group, a sub-group analysis among children with at least one report or substantiation was conducted. Group differences in subtype frequency and perpetrator characteristics, while controlling for gender, ethnicity, maternal education, and income, were evaluated using ANCOVA with Bonferroni-corrected post hoc comparisons if overall *F*-tests were significant at the $p < .001$ level, given the high number of statistical tests. Post hoc comparisons were also evaluated amongst the ASD-only, ASD+ID, and ID-only groups to evaluate whether risk is greater for certain disability groups. A second sub-analysis among the ASD (ASD-only, ASD+ID) groups using multinomial logistic regressions was used to evaluate whether maltreatment related to behavioral indicators, controlling for child gender.

Information regarding missing data is provided in Table 1. There was a significant portion (10%) of missing data for maternal education, which was estimated using multiple imputation for substantive analyses. Sensitivity analyses were conducted and confirmed that the overall interpretation of findings was not affected by the inclusion or exclusion of maternal education. Thus, reported analyses are adjusted for maternal education.

Results

Odds of experiencing maltreatment

The adjusted odds ratios of experiencing overall reported and substantiated maltreatment by group are presented in Table 2. The ASD-only, ASD+ID, and ID-only groups were more likely to have reported and substantiated maltreatment relative to the PC group. The adjusted odds ratios of experiencing maltreatment subtypes are presented in Table 3. For sexual abuse, the ASD+ID and ID-only groups were more likely to have reports compared to controls, whereas only the ID-only group was more likely to have substantiations. For physical abuse, all groups (ASD-only, ASD+ID, ID-only) were more likely to have reports than controls, whereas only the ID-only group was more likely to have substantiations. For emotional abuse, the ASD-only and ID-only groups were more likely to have reports and the ID-only group was more likely to have substantiations relative to controls. For physical neglect, all groups (ASD-only, ASD+ID, ID-only) were more likely to have reports and substantiations than controls.

Characteristics of maltreatment

Evaluation of group differences in maltreatment characteristics among maltreated youth is presented in Table 4. Regarding subtypes, the ASD-only (mean diff = 0.90, $p = .002$) and ID-only groups (mean diff = 0.46, $p = .001$) had significantly more cases with alleged physical abuse than controls. The ASD-only (mean diff = 0.92, $p = .044$) and ID-only (mean diff = 1.05, $p = .000$) groups also had significantly more cases involving alleged and substantiated physical neglect than controls (mean diff for ASD-only = 1.89, $p = .002$; mean diff for ID-only = 1.21, $p = .000$). Regarding perpetrator variables (Table 4), the ASD+ID (mean diff = 0.63, $p = .028$) and ID-only (mean diff = 0.82, $p = .000$) had more distinct perpetrators reported across cases. The ID-only group (mean diff = 0.72, $p = .000$) had more reported cases with immediate family members named as perpetrator relative to controls. For substantiations, the ASD-only (mean diff = 1.26, $p = .014$) and ID-only groups (mean diff = 1.06, $p = .000$) experienced more substantiated perpetrators across cases than controls. Further, the ASD-only (mean diff = 0.98, $p = .036$) and ID-only groups (mean diff = 0.87, $p = .000$) had more cases with immediate family caregivers substantiated as perpetrators than controls. No pairwise comparisons between the ASD-only, ASD+ID, and ID-only groups were significant.

Table 2 Multivariable logistic regressions predicting the likelihood of maltreatment (n = 4,953)

	Any report		Any substantiation	
Dependent variable	OR (95% CI)	*p*	OR (95% CI)	*p*
Covariates				
Female gender	1.22 (1.04, 1.44)	.016	1.18 (0.971, 1.43)	.097
Income	0.806 (0.684, 0.949)	.010	0.859 (0.701, 1.05)	.143
African American ethnicity	1.05 (0.767, 1.42)	.779	1.05 (0.714, 1.53)	.817
Hispanic ethnicity	0.601 (0.343, 1.06)	.077	0.692 (0.349, 1.38)	.294
Other ethnicity	1.20 (0.774, 1.87)	.410	1.03 (0.587, 1.80)	.925
Maternal education	0.451 (0.403, 0.505)	.000	0.423 (0.369, 0.485)	.000
Group				
ASD-only	1.86 (1.36, 2.52)	.000	1.51 (1.01, 2.26)	.044
ASD+ID	2.35 (1.77, 3.12)	.000	1.97 (1.39, 2.79)	.000
ID-only	2.45 (2.09, 2.88)	.000	2.49 (2.05, 3.02)	.000

For ethnicity, non-hispanic White is the reference group. For group, the population control (PC) is the reference group.

Table 3 Multivariable logistic regressions predicting the likelihood of maltreatment by subtype (n = 4,953)

	Sexual abuse				Physical abuse			
	Report		Substantiation		Report		Substantiation	
Dependent variable	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Covariates								
Female gender	2.88 (1.92, 4.32)	.000	3.59 (1.63, 7.91)	.001	1.07 (0.843, 1.37)	.563	1.32 (0.886, 0.1.98)	.171
Income	0.695 (0.438, 1.11)	.124	0.562 (0.236, 1.34)	.192	0.762 (0.590, 0.984)	.037	0.811 (0.513, 1.28)	.368
African American ethnicity	0.550 (0.238, 1.27)	.162	0.374 (0.079, 1.77)	.215	0.949 (0.591, 1.52)	.829	1.04 (0.447, 2.41)	.931
Hispanic ethnicity	0.207 (0.024, 1.77)	.150	0.621 (0.051, 7.50)	.708	0.550 (0.224, 1.35)	.192	1.17 (0.320, 4.28)	.813
Other ethnicity	2.04 (0.800, 5.20)	.150	3.27 (0.690, 15.48)	.135	1.36 (0.728, 2.55)	.334	1.26 (0.399, 3.94)	.698
Maternal education	0.483 (0.351, 0.665)	.000	0.413 (0.220, 0.777)	.006	0.572 (0.488, 0.670)	.000	0.517 (0.376, 0.711)	.000
Group								
ASD-only	1.09 (0.330, 3.62)	.886	0.000	.999	**2.76 (1.84, 4.14)**	**.000**	1.41 (0.594, 3.33)	.439
ASD+ID	**3.13 (1.51, 6.50)**	**.002**	3.48 (0.919, 13.21)	.066	**1.71 (1.09, 2.67)**	**.019**	0.978 (0.386, 2.48)	.963
ID-only	**2.76 (1.75, 4.37)**	**.000**	**2.40 (1.01, 5.71)**	**.048**	**2.19 (1.72, 2.79)**	**.000**	**1.88 (1.25, 2.82)**	**.002**

	Emotional abuse				Physical neglect			
	Report		Substantiation		Report		Substantiation	
Covariates								
Female gender	1.28 (0.979, 0.1.66)	.071	1.11 (0.805, 1.54)	.514	1.07 (0.896, 1.28)	.458	1.11 (0.896, 1.37)	.346
Income	1.00 (0.763, 1.31)	.993	1.11 (0.793, 1.55)	.548	0.761 (0.635, 0.912)	.003	0.819 (0.654, 1.03)	.084
African American ethnicity	1.22 (0.721, 2.06)	.461	1.63 (0.847, 3.13)	.144	0.866 (0.618, 1.21)	.401	0.896 (0.590, 1.36)	.604
Hispanic ethnicity	0.716 (0.254, 2.06)	.527	0.827 (0.222, 3.09)	.778	0.488 (0.261, 0.913)	.025	0.530 (0.243, 1.16)	.110
Other ethnicity	1.81 (0.933, 3.50)	.079	1.94 (0.855, 4.42)	.112	1.09 (0.671, 1.76)	.735	0.840 (0.445, 1.59)	.590
Maternal education	2.81 (2.16, 3.64)	.000	0.494 (0.394, 0.620)	.000	0.430 (0.380, 0.486)	.000	0.405 (0.347, 0.471)	.000
Group								
ASD-only	1.63 (0.959, 2.77)	.071	1.64 (0.857, 3.14)	.135	**1.70 (1.21, 2.40)**	**.002**	**1.61 (1.04, 2.50)**	**.035**
ASD+ID	**1.70 (1.03, 2.78)**	**.036**	1.41 (0.737, 2.69)	.300	**2.35 (1.73, 3.18)**	**.000**	**2.13 (1.47, 3.11)**	**.000**
ID-only	**2.08 (1.59, 2.73)**	**.000**	**2.23 (1.61, 3.08)**	**.000**	**2.51 (2.11, 2.98)**	**.000**	**2.67 (2.17, 3.30)**	**.000**

For ethnicity, non-hispanic White was the reference group. For group, population control was the reference group. Bold values indicate significant odds ratios associated with group status.

Table 4 Maltreatment characteristics among children with at least one report (n = 1,154) or substantiation (n = 667)

Variable	ASD-only *M* (*SD*)	ASD+ID *M* (*SD*)	ID-only *M* (*SD*)	PC *M* (*SD*)	Overall *F*	*p*
Characteristics among Children with at least one Report	n = 66	n = 90	n = 501	n = 497		
Number of different subtypes reported across cases	1.53 (0.61)	1.40 (0.65)	1.53 (0.76)	1.39 (0.62)	3.65	.012
Number of cases with sexual abuse reported	0.12 (0.62)	0.36 (1.28)	0.37 (1.30)	0.16 (0.76)	2.51	.057
Number of cases with physical abuse reported	**1.61 (2.58)**	0.87 (1.95)	**1.13 (2.12)**	0.72 (1.42)	**7.49**	**.000**
Number of cases with emotional abuse reported	0.53 (1.14)	0.64 (1.61)	0.86 (1.92)	0.57 (1.31)	3.63	.013
Number of cases with physical neglect reported	**2.50 (3.91)**	2.27 (2.96)+	**2.60 (2.98)**	1.66 (1.82)	**13.65**	**.000**
Number of different perpetrators reported across cases	2.64 (2.35)+	**2.56 (1.98)**	**2.76 (2.25)**	2.01 (1.51)	**14.71**	**.000**
Number of cases with immediate family caregiver alleged	2.14 (2.18)	2.00 (1.70)	**2.31 (1.94)**	1.68 (1.32)	**14.11**	**.000**
Number of cases with extended family member alleged	0.32 (1.00)	0.26 (0.76)	0.20 (0.52)	0.14 (0.40)	3.86	.009
Number of cases with extrafamilial individual alleged	0.15 (0.50)	0.20 (0.46)	0.13 (0.42)	0.10 (0.33)	1.97	.116
Number of cases with child/sibling alleged	0.03 (0.17)	0.10 (0.34)	0.13 (0.37)	0.09 (0.31)	1.45	.227
Characteristics among Children with at least one Substantiation	n = 32	n = 47	n = 316	n = 272		
Number of different subtypes substantiated across cases	1.34 (0.48)	1.23 (0.52)	1.35 (0.59)	1.28 (0.54)	1.03	.380
Number of cases with sexual abuse substantiated	0.00 (0.00)	0.23 (1.11)	0.23 (1.23)	0.11 (0.67)	0.79	.503
Number of cases with physical abuse substantiated	0.78 (2.09)	0.32 (1.11)	0.55 (1.61)	0.44 (1.17)	1.07	.363
Number of cases with emotional abuse substantiated	0.72 (1.37)	0.57 (1.32)	0.98 (2.09)	0.67 (1.35)	2.64	.049
Number of cases with physical neglect substantiated	**3.72 (5.13)**	2.91 (3.76)+	**2.95 (2.92)**	1.84 (2.01)	**11.14**	**.000**
Number of different perpetrators substantiated across cases	**3.59 (2.96)**	3.06 (2.42)	**3.28 (2.48)**	2.31 (1.70)	**11.76**	**.000**
Number of cases with immediate family caregiver substantiated	**3.00 (2.81)**	2.51 (1.96)	**2.74 (2.12)**	1.97 (1.47)	**10.43**	**.000**
Number of cases with extended family member substantiated	0.47 (1.34)	0.30 (0.93)	0.23 (0.59)	0.14 (0.38)	4.10	.007
Number of cases with extrafamilial individual substantiated	0.09 (0.30)	0.21 (0.51)	0.16 (0.47)	0.11 (0.34)	1.41	.240
Number of cases with child/sibling substantiated	0.03 (0.18)	0.04 (0.20)	0.15 (0.40)	0.10 (0.32)	1.66	.175

F-statistics utilized to determine whether group comparisons were evaluated for significance in post-hoc, Bonferroni-corrected analyses. Bolded means are significantly higher than PC. + =means are slightly higher than PC ($p < .10$).

Behavioral correlates of maltreatment status

The associations between maltreatment report status and behavioral features among children with ASD is presented in Table 5. Adjusting for gender, maltreatment status was associated with higher likelihood of aggression, hyperactivity, and tantrums.

Discussion

Overall, children with ASD-only, ASD+ID, and ID-only had significantly higher odds of reported and substantiated maltreatment relative to a population control group. With almost one in three children with ASD+ID reported to child protective services for maltreatment, and over one in five children with ASD-only, these results bolster a growing literature emphasizing the importance of identifying and addressing maltreatment risk in ASD (Hoover, 2015; Hoover & Kaufman, 2018). Use of well-established rigorous ADDM methodology that objectively identified a high number of children with ASD, and linkage with state-wide child protective service records, may have allowed for identification of increased risk associated with ASD in contrast to prior work (e.g. Maclean et al., 2017; Spencer et al., 2005). Drawing on transactional-ecological models of maltreatment risk and developmental psychopathology theory (Cicchetti & Valentino, 2006), children with ASD are likely at elevated maltreatment risk due to a complex interplay of individual (social difficulties, communication deficits, difficult behaviors), parental (family stress) and environmental (cultural attitudes, increased interactions with multiple service systems) factors (Algood, Hong, Gourdine, & Williams, 2011; Kerns et al., 2015).

Risk for subtypes of maltreatment varied across groups. All groups were more likely to experience reported and substantiated physical neglect. Children with ASD+ID and ID-only were more likely to experience reported sexual, physical, and emotional abuse, whereas children with ASD-only were only more likely to experience reported physical abuse. Only children with ID-only were more likely to have substantiations of sexual, physical, and emotional abuse. Thus, while children with ASD+ID and ID-only were at elevated risk for reports of all maltreatment subtypes, children with ASD-only appeared uniquely at risk for reported physical abuse. That only children with ID-only were more likely to have substantiations of abuse relative to controls suggests that it may be more difficult to substantiate the presence of abuse for children with ASD. It is possible that children with ASD may present with additional social communication difficulties that make it more challenging to ascertain the presence of abuse, or case workers may respond differently depending on child disability status (e.g. Manders & Stoneman, 2009). It is essential for future research to examine these how children with ASD are processed by child protective services to ensure appropriate identification and supports.

Characteristics of maltreatment

Even compared to other maltreated youth, children with ASD and/or ID are at risk for more frequent and complex maltreatment. Children with ASD-only and ID-only experienced more cases involving reports of physical abuse and neglect compared to maltreated children without developmental disabilities. Further, the ASD-only and ID-only groups had more cases with an immediate family caregiver named as perpetrator than maltreated children in the PC group. This is consistent with extant research documenting that the majority of maltreatment experiences are perpetrated by a caregiver (U.S. Department of Health and Human Services, 2017), and highlights the power of parent-child prevention and intervention approaches for children with ASD and/or ID as well as for typically developing children. The ASD-only and ID-only groups also had a higher number of different perpetrators who were substantiated across all of their cases, suggesting that children with ASD and ID may be at risk for complicated maltreatment perpetrated by multiple individuals.

Behavioral correlates of maltreatment

For children with ASD, maltreatment was associated with a higher likelihood of hyperactivity, aggression, and temper tantrums. This is consistent with prior research documenting that children with ASD who have experienced abuse may have heightened disruptive behaviors (Howlin & Clements, 1995) and difficulties similar to those of typically developing maltreated children (Brenner et al., 2017). However, these behavioral measures relied on descriptors

Table 5 Associations between maltreatment and behaviors among children with ASD (n = 607)

Associated behavioral features	No allegation % (n = 449)	With allegation % (n = 158)	OR (95% CI)	p
Abnormalities in mood or affect	55.7	62.7	1.36 (0.94, 1.98)	.106
Aggression	43.9	55.1	1.62 (1.12, 2.34)	.011
Hyperactivity, attention deficits	79.7	87.3	1.84 (1.09, 3.11)	.024
Self-injurious behavior	30.7	33.5	0.98 (0.71, 1.35)	.899
Temper tantrums	51.2	60.1	1.48 (1.02, 2.14)	.040

Odds ratios are adjusted for child gender.

within extracted records rather than validated symptom measures, and it was not possible to identify the direction of effects (e.g. whether behaviors placed children at risk or were a consequence of maltreatment). Much work remains to be done in the identification and measurement of trauma-related symptoms in ASD (Kerns et al., 2015).

Limitations and future directions

Although this study showed significantly higher rates of maltreatment among children with ASD and/or ID, the study design could not identify bidirectional relationships between ASD and maltreatment. Moreover, the control group was not reevaluated for late ASD diagnosis after age 8, which may have under-identified children with subtle ASD presentations and potentially led to misclassification. Longitudinal, prospective research is critical in this area. There are several additional limitations to the current investigation. Maltreatment data from state social services only reflects cases that were formally reported, which may underestimate the true prevalence of maltreatment and non-caregiver perpetrated maltreatment. In addition, this study did not incorporate other stressful (e.g. bullying) or adverse childhood experiences (e.g. community violence), nor involvement with adult protective services. Lastly, limited information was available regarding family socio-economic status, and future research should examine how other poverty indicators relate to maltreatment for children with disabilities (e.g. Putnam-Hornstein & Needell, 2011).

In summary, the current investigation represents the first empirical evidence from population-level data that the prevalence of maltreatment is elevated in ASD relative to the general population. Establishing that children with ASD, who are already a population vulnerable to elevated family stress and emotional and behavioral difficulties, are also at heightened risk for maltreatment emphasizes the urgent need to consider developmental disability status in child maltreatment research and refine clinical supports for those doubly vulnerable families affected by both maltreatment and ASD and/or ID (Hoover & Kaufman, 2018).

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Key points

- Children with developmental disabilities are at heightened risk for maltreatment, although less is known regarding risk for particular groups including autism spectrum disorder (ASD) and/or intellectual disability (ID).
- Using population-level data, the current study found that children with ASD-only, ASD+ID, and ID-only had substantially elevated odds of reported and substantiated maltreatment compared to population controls.
- Maltreatment was associated with hyperactivity, aggression, and temper tantrums for children with ASD.
- Empirically-supported assessment and intervention approaches for identifying and addressing maltreatment in ASD and ID are urgently needed.

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