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Link to publication

Prevalence of and relationship between adverse childhood experiences and family context risk factors among children with intellectual disabilities and borderline intellectual functioning

Jessica Vervoort-Schel [a,b,*], Gabriëlle Mercera [a,g], Inge Wissink [b],
Peer Van der Helm [c,d,e], Ramón Lindauer [e,f], Xavier Moonen [a,b]

[a] Koraal Centre of Expertise, De Hondsberg, Hondsberg 5, 5062 JT Oisterwijk, the Netherlands
[b] Department of Child Development and Education, University of Amsterdam, Nieuwe Achtergracht 127, 1018 WS Amsterdam, the Netherlands
[c] Expert Centre Social Work and Applied Psychology, Professional University of Applied Sciences Leiden, Zernikedreef 11, 2333 CK Leiden, the Netherlands
[d] Fier, National Expertise and Treatment Centre, Holstmeerweg 1, 8936 AS Leeuwarden, the Netherlands
[e] Amsterdam UMC, University of Amsterdam, Department Child and Adolescent Psychiatry, Meibergdreef 5, 1105 AZ Amsterdam, the Netherlands
[f] Levvel, Academic Centre for Child and Adolescent Psychiatry, Meibergdreef 5, 1105 AZ Amsterdam, the Netherlands
[g] Department of Psychiatry and Neuropsychology, Maastricht University, Vijverdalseweg 1, 6226 NB Maastricht, the Netherlands

ARTICLE INFO

ABSTRACT

Background: Adverse Childhood Experiences (ACEs) are an overlooked risk factor for behavioural, mental and physical health disparities in children with intellectual disabilities (ID) and borderline intellectual functioning (BIF).
Aims: To gain insight into the presence of the 10 original Wave II ACEs and family context risk variables in a convenience sample of children with ID and BIF in Dutch residential care.
Methods and procedures: 134 case-files of children with ID ($n = 82$) and BIF ($n = 52$) were analysed quantitatively.
Outcomes and results: 81.7 % of the children with ID experienced at least 1 ACE, as did 92.3 % of the children with BIF. The average number of ACEs in children with ID was 2.02 (range 0−8) and in children with BIF 2.88 (range 0−7). About 20 % of the children with moderate and mild ID experienced 4 ACEs or more. Many of their families faced multiple and complex problems (ID: 69.5 %; BIF 86.5 %). Multiple regression analysis indicated an association between family context risk variables and the number of ACEs in children.
Conclusions and implications: The prevalence of ACEs in children with ID and BIF appears to be considerably high. ACEs awareness in clinical practice is vital to help mitigate negative outcomes.

What this paper adds?

Adverse Childhood Experiences (ACEs) are an overlooked risk factor for behavioural, mental and physical health disparities in children with intellectual disabilities or borderline intellectual functioning. Moreover these children are strongly under-represented in global ACE research. ACEs affect significant numbers of children worldwide, but children with intellectual disabilities are even more

susceptible to ACEs. The limited evidence available suggests that they could also be more vulnerable to the harmful effects of ACEs. This study yields case-file data on ACE as defined by the 10 original Wave II ACEs and family context risk variables in a Dutch convenience sample (N = 134) of children with severe, moderate, and mild intellectual disabilities or borderline intellectual functioning. All children were admitted to a national centre for observation, diagnostics and treatment for an average of 18 months because of their severe behavioural and developmental problems and possible comorbid psychiatric disorders. This research contributes to increasing awareness of the presence of ACEs in children with intellectual disabilities and borderline intellectual functioning and their parents. It emphasises the need to develop family-centred and trauma-informed care to reduce physical and mental health disparities and increase their well-being and opportunities in life.

1. Introduction

Children with intellectual disabilities (ID) have significant deficits in both intellectual and adaptive functioning (APA, 2013). The adjectives "mild", "moderate", "severe" and "profound" refer to deficits in adaptive functioning. Often the cause of the ID is unknown and a combination of biomedical, social, behavioural and educational causes may play a role (Hatton, 2012). BIF in children is often insufficiently recognised (Fernell & Ek, 2010), while the sparse literature shows that both groups face overlapping problems in life (Emerson, Einfeld, & Stancliffe, 2010; Nouwens, Lucas, Embregts, & van Nieuwenhuizen, 2017). Children with developmental disorders are less likely to grow up at home, are more likely to experience placement instability and lack of continuity in care, which can lead to ongoing experiences of adversity (Morris, Webb, Parmar, Trundle, & McLean, 2020). There are indications that childhood adversity increases the odds of residential placement for children (Vervoort-Schel et al., 2018; Zettler, Wolff, Baglivio, Craig, & Epps, 2018).

Adverse Childhood Experiences (ACEs) are experiences of abuse, neglect or household dysfunction and have been found to significantly contribute to negative health outcomes throughout life (Felitti et al., 2019). Prior research has revealed the relationship between childhood adversity and developmental, social, emotional, behavioural, mental and physical health consequences in children (Bright, Knapp, Hinojosa, Alford, & Bonner, 2016; Cprek, Williamson, McDaniel, Brase, & Williams, 2020; Garrido, Weiler, & Taussig, 2018). There is a complex interaction between family environments, duration and type of adversity and pre-existing characteristics of the child (Nelson et al., 2020). Girls and boys may be differentially vulnerable to specific ACEs (Turney, 2020), however in a recent longitudinal study the clustering did not reveal gender differences (Lacey, Howe, Kelly-Irving, Bartley, & Kelly, 2020). Resilience originates from both individual and contextual characteristics and can play a buffering role for the negative effects of ACEs (Scheffers, van Vugt, & Moonen, 2020), but as ACEs increase, the chance of resilience decreases (Heard-Garris, Davis, Szilagyi, & Kan, 2018). Children with ID are overall less likely to be resilient than children in the general population (Emerson, 2015).

Children and adults with ID face many health inequities in life, both within and between populations (Emerson, 2013; Northway, 2017). Compared to the general population, they have a higher risk of poorer overall health, behavioural and psychiatric disorders and have high rates of serious health conditions (Brown, Jacobstein, Yoon, Anthony, & Bullock, 2016; Staunton, Kehoe, & Sharkey, 2020). Childhood adversity may aggravate existing social inequalities in children's health (Turney, 2020). ACEs can be thought of as parts of an interconnected web; some ACEs are risks for other ACEs (Berg et al., 2019; Tonmyr, Lacroix, & Herbert, 2020). Children with ID more often grow up in unfavourable socio-economic circumstances (Emerson, 2013) and poverty is strongly associated with both individual ACEs and ACE clusters (Lacey et al., 2020). In 2004, Hatton & Emerson found that children with ID were more likely to experience a greater number and range of adversities than children without ID. Unfortunately, ACEs are still an often overlooked risk factor for these marked health problems (Berg et al., 2019; Santoro, Shear, & Haber, 2018) and children with limitations in cognitive and adaptive functioning are still largely overlooked in global ACE research (Berg et al., 2019; Vervoort-Schel et al., 2018).

1.1. ACEs prevalence in adults and children with ID

To the best of our knowledge, no prevalence studies among adults and children with ID have been conducted based on the original ACE framework Wave II. In 2015 Wigham & Emerson concluded that experiences of sexual abuse, violence and poverty were found to be high in people with ID. In a sample of 33 adults with mild to moderate ID, a proportion of 42.4 % reported multiple traumatisation in both childhood and adulthood (Mason-Roberts et al., 2018). In the study of Santoro et al. (2018), 84.1 % of 88 adults with intellectual and developmental disabilities residing in campus-based residences experienced 1 or more ACEs out of 14 adversities.

Children with limitations in cognitive and adaptive functioning seem to have higher risks for physical, emotional and sexual abuse (Jones et al., 2012; Wissink, van Vugt, Moonen, Stams, & Hendriks, 2015). Jones et al. (2012) indicated that children with disabilities had a 3–4 times increased risk to be victims of violence than their peers without disabilities. Wissink et al. (2015) concluded that sexual abuse prevalence estimates ranged from 14 % to 32 % among children with ID and the relative risk was estimated 4–8 times higher for these children compared to children with average intelligence. Hassiotis et al. (2019) summarized that "children with intellectual disability are between three and seven times more likely to experience neglect, physical, emotional and sexual abuse and experience a broader range of adversities compared to other children" (p. 2). Unfortunately, few studies looked into adversity rates in children with ID. Results of the national study of Berg et al. (2019) indicate that children (mean age 8.9 years) with developmental disorders, among which ID, "experience disproportionate levels of family adversity in comparison to peers without disabilities" (p. 105), regardless of income level or residential status. A study among 180 children aged 2–7 years with developmental delays revealed that 47 % of the children experienced 1 adversity and 4.5 % experienced 4 or more adversities, but abuse and neglect were not assessed and income, discrimination and death of a parent/guardian were also part of the 9 adversity questions (Mehari, Iyengar, Berg, Gonzales, & Bennett, 2020). Findings from a British cohort study (Hassiotis et al., 2019) revealed that children with BIF were significantly more likely than
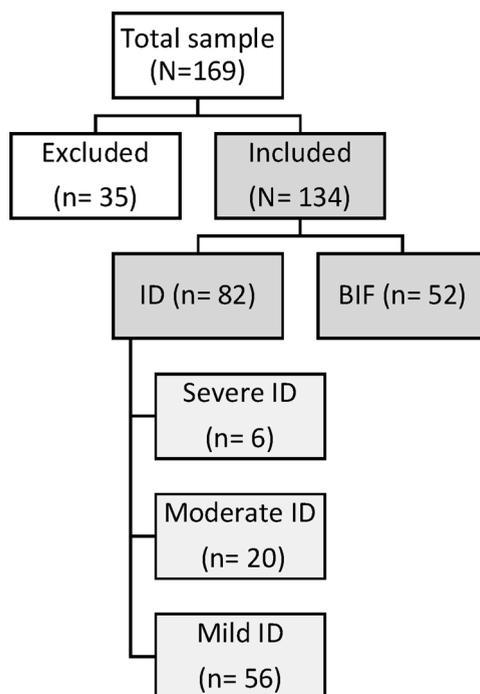
Fig. 1. Sample of the present study.

their peers to be exposed to health related and socio-economic related adversity.

1.2. Families of children who experience adversities

Safe, stable and nurturing relationships can provide a foundation for healthy child development (Merrick, Ports, Guinn, & Ford, 2020). Positive parenting practices can reduce the risk for developmental delays in children (Cprek et al., 2020). Family functioning is strongly linked to children's exposure to adversities (Scully, McLaughlin, & Fitzgerald, 2020). When parents have experienced adversities (Crouch, Radcliff, Strompolis, & Srivastav, 2019), or are dealing with mental health problems (Jaffee et al., 2013), ID (May & Harris, 2020), a limited social network (Thornberry et al., 2013) and/or financial problems (Merrick & Guinn, 2018), it can be challenging to provide a supportive, nurturing environment for their children. This can lead to an intergenerational cycle of adversity in which the disadvantaged child rearing conditions and patterns are passed on to the next generation (Stack, Serbin, Mantis, & Kingdon, 2015; Woods-Jaeger, Cho, Sexton, Slagel, & Goggin, 2018).

In addition to general problems in the functioning of the family, families of children with ID may experience additional psychological distress due to challenging behaviour or comorbid problems, which can have a negative impact on the parent-child relationship and the behaviour of the child (Staunton et al., 2020). A study among parents with ID found that they also experience high parenting stress when their child shows behavioural problems, especially when there is little social support available (Meppelder, Hodes, Kef, & Schuengel, 2015).

1.3. Study aim

The current study focuses on ACEs in children with an ID or BIF and their family context. In Dutch care, children with BIF have access to the same care as children with an ID. This study builds on a previous case-file study regarding ACEs in children with ID in residential care (Vervoort-Schel et al., 2018). Using a larger sample and exploring differences between levels of intellectual functioning, the objectives of this study are: 1) to explore the number of ACEs in children based on the original 10 ACEs framework Wave II ((Anda et al., 2009)); 2) to explore family context risk variables; 3) to investigate the relationship between the number of ACEs and family context risk variables.

2. Method

2.1. Sample

This research included 169 case files of children discharged in the period 2016–2019 from a national centre for residential youth care in the Netherlands for specialized clinical observation, diagnostics and treatment for both children with ID and BIF. Besides

Table 1
Demographics of children with ID and BIF.

	Severe ID % (*n*)	Moderate ID % (*n*)	Mild ID % (*n*)	Total ID % (*n*)	BIF % (*n*)	Total N % (*n*)
N	6	20	56	82	52	134
Gender						
Male	100 (6)	75.0 (15)	66.1 (37)	70.7 (58)	59.6 (31)	66.4 (89)
Female	0 (0)	25.0 (5)	33.9 (19)	29.3 (24)	40.4 (21)	33.6 (45)
Age (*M*)	9.5	12.2	10.7	11.0	11.5	11.2
	SD 2.88	SD 2.72	SD 3.14	SD 3.08	SD 3.26	SD 3.15
	RNG 7-14	RNG 7-16	RNG 2-16	RNG 2-16	RNG 3-17	RNG 2-17
Co-morbid clinical disorder	83.3 (5)	70.0 (14)	83.9 (47)	80.5 (66)	90.4 (47)	85.1 (114)
Child protection measure	0.0 (0)	15.0 (3)	30.4 (17)	24.2 (20)	36.5 (19)	29.1 (39)

deficits in cognitive and adaptive functioning, these children experience severe, persistent and complex mental- and behavioural health problems, and cannot benefit sufficiently from support in their own region. 35 case-files were excluded due to: I) incomplete information (5), II) total IQ > 85 (17), III) outpatient clinic clients (4), IV) day treatment clients (9).

The case-files of 134 children between the ages of 2 and 17 years old (*M* = 11.2, *SD* = 3.1; 66.4 % male) were analysed. The convenience sample (Fig. 1) consisted of 4 subgroups: children with severe (*n* = 6), moderate (*n* = 20), mild (*n* = 56) ID and children with BIF (*n* = 52). This level of intellectual and adaptive functioning was assessed with standardised tests (APA, 2013) during admission by a multidisciplinary team as part of the clinical observation period.

2.2. Procedure

Data were collected in accordance with the Dutch General Data Protection Regulation (GDPR) in the time frame March 2018 – August 2020. The study was approved by the Ethics Review Board of the University of Amsterdam (2018-CDE-8871).

All case-files had a standardised structure and included relevant pre-admission youth and family care reports and multidisciplinary care plans generated during the admission. Children were admitted for an average of 18 months.

The variables were well defined in a codebook by means of definitions, criteria and sources (reports) in the case-files. The presence of a variable was coded with '1' in the data-file if the information in the case-file regarding the variable matched the criteria as operationalized in the codebook. The absence of a variable was coded with '0'. This could mean the variable was not present in the child's and family's life, but it could also mean the involved professional did not report it for various possible reasons.

Two trained staff members and three trained researchers collected the data after practice and under direct supervision of one of the researchers that was also involved in the draft of the codebook and the collection of the data. To calculate the inter-rater reliability, 25 % of the case-files of the total case-file study (N = 169) was examined independently by both researchers. The inter-rater reliability was 96,6 %, which is considered high.

2.3. Measures

Table A1 (see Appendix A) provides an overview and explanation of the variables related to the demographics of the convenience sample. The original ACE framework Wave II ((Anda et al., 2009)) was used to inventory the presence of 10 specific ACEs (see Appendix A, Table A2). In accordance with the recommended categorisation of ACEs into 3 subscales by Ford et al. (2014), the 10 ACEs in Table A2 were grouped according to the categories Emotional/physical abuse, Sexual abuse and Domestic dysfunction. Based on insights gained in the previous case-file study (Vervoort-Schel et al., 2018), several other family risk factors which may affect safe, stable and nurturing rearing contexts were included (see Appendix A, Table A3). Because an accumulation of problems in families can increase the risk of child abuse and neglect (Knot-Dickscheit & Knorth, 2019), a summary variable 'indication of multiple and complex problems in the family' (Dekovic & Bodden, 2019) was added to give an impression of the number of children originating from families experiencing an accumulation of problems (see Appendix A, Table A4).

2.4. Statistical analyses

All statistical analyses were carried out using SPSS, version 26 (IBM, Armonk, NY, USA). Descriptive statistics were used to present the demographics and to explore the prevalence of ACEs and the family context variables . Chi-square tests were used to explore possible differences between groups on categorical ACEs and family variables. For Chi-square tests, all assumptions were met, with the exception of the comparisons regarding the subgroup of children classified with severe ID. Therefore, only the children classified with moderate ID, mild ID and BIF were included in the Chi-square analyses. To explore differences between groups on continuous variables, the non-parametric Mann-Whitney *U* test and the Kruskall-Wallis test were used as the assumptions of normality and homogeneity were not met. To explore the relationship between the family context risk variables and number and type of ACEs, point biserial correlations and phi coefficients were calculated using Pearson correlations and bootstrapped confidence intervals. Multiple linear regression analysis was used to further investigate the relationship between the family context risk factors and numbers of ACEs. Bootstrapped confidence intervals and Bonferroni corrections were calculated to counteract the problems of non-normality and multiple comparisons. The assumptions regarding linearity between the outcome variable and de independent variables, normally

Table 2
Prevalence of ACEs Wave II original framework ((Anda et al., 2009)).

	Severe ID (%, *n*)	Moderate ID (%, *n*)	Mild ID (%, *n*)	Total ID (%, *n*)	BIF (%, *n*)	Total N (%, *n*)
N	6	20	56	82	52	134
	0.83 M	1.95 M	2.18 M	2.02 M	**2.88**[*] **M**	2.36 M
Number of ACEs	SD 1,17	SD 2.0	SD 1.78	SD 1.81	SD 1.64	SD 1.79
	RNG 0-3	RNG 0-7	RNG 0-8	RNG 0-8	RNG 0-7	RNG 0-8
	0.17 M	0.45 M	0.59 M	0.52 M	0.81 M	0.63 M
Emotional/physical abuse neglect	SD 0.41	SD 1.00	SD 0.97	SD 0.95	SD 0.95	SD 0.95
	RNG 0-1	RNG 0-3	RNG 0-4	RNG 0-4	RNG 0-3	RNG 0-4
	0.0 M	0.10 M	0.07 M	0.07 M	0.06 M	0.07 M
Sexual abuse	SD 0.00	SD 0.31	SD 0.26	SD 0.26	SD 0.24	SD 0.25
	RNG 0-0	RNG 0-1	RNG 0-1	RNG 0-1	RNG 0-1	RNG 0-1
	0.67 M	1.40 M	1.52 M	M 1.43	**2.02**[*] **M**	1.66 M
Household dysfunction	SD 0.82	SD 1.27	SD 1.06	SD 1.11	SD 1.18	SD 1.17
	RNG 0-2	RNG 0-4	RNG 0-4	RNG 0-4	RNG 0-5	RNG 0-5
≥ 1 ACEs	50.0 (2)	80.0 (16)	85.7 (48)	81.7 (67)	92.3 (48)	85.8 (115)
≥ 2 ACEs	16.7 (1)	40.0 (8)	51.8 (29)	46.3 (38)	**76.9 (40)**[^]	58.2 (78)
≥ 3 ACEs	16.7 (1)	30.0 (6)	41.1 (23)	36.6 (30)	**63.5 (33)**[^]	47.0 (63)
≥ 4 ACEs	0.0 (0)	20.0 (4)	21.4 (12)	19.5 (16)	32.7 (17)	24.6 (33)
≥ 5 ACEs	0.0 (0)	15.0 (3)	8.9 (5)	9.8 (8)	15.4 (8)	11.90 (16)
≥ 6 ACEs	0.0 (0)	5.0 (1)	5.4 (3)	4.9 (4)	5.8 (3)	5.2 (7)
Physical abuse	0.0 (0)	5.0 (1)	21.4 (12)	15.9 (13)	17.3 (9)	16.4 (22)
Emotional abuse	0.0 (0)	5.0 (1)	12.5 (7)	9.8 (8)	9.6 (5)	9.7 (13)
Physical neglect	0.0 (0)	20.0 (4)	8.9 (5)	11.0 (9)	17.3 (9)	13.4 (18)
Emotional neglect	16.7 (1)	15.0 (3)	16.1 (9)	15.9 (13)	**36.5 (19)**[^]	23.9 (32)
Sexual abuse	0.0 (0)	10.0 (2)	7.1 (4)	7.3 (6)	5.8 (3)	6.7 (9)
Parental incarceration	0.0 (0)	10.0 (2)	1.8 (1)	3.7 (3)	17.3 (9)	9.0 (12)
Parental separation or divorce	33.3 (2)	55.0 (11)	62.5 (35)	58.5 (48)	73.1 (38)	64.2 (86)
Domestic violence	16.7 (1)	15.0 (3)	32.1 (18)	26.8 (22)	38.5 (20)	31.3 (42)
Parental substance abuse	00.0 (0)	20.0 (4)	21.4 (12)	19.5 (16)	26.9 (14)	22.4 (30)
Parental mental health problems	16.7 (1)	40.0 (8)	33.9 (19)	34.1 (28)	46.2 (24)	38.8 (52)

[*] Significant difference between the BIF group and the total ID group ($p < .05$).

[^] Significant difference between the BIF group and the total ID group and the BIF group and the subgroups moderate ID and mild ID ($p < .05$).

distributed residuals, multicollinearity and homoscedasticity were met.

3. Results

3.1. Demographics

In Table 1 demographic data are presented per subgroup. Regarding the demographics, no significant differences were found between the groups.

3.2. Adverse Childhood Experiences Wave II original framework

In Table 2 the average number of ACEs in children with ID was 2.02 ($SD = 1.81$; range 0−8) and in children with BIF 2.88 ($SD = 1.64$; range 0−7). This difference was significant ($U = 1469.5, p = .002$): children with BIF experienced on average significantly more ACEs than children with ID. Bonferroni correction in post-hoc pairwise comparisons showed no significant differences in the average number of ACEs between children with severe moderate and mild ID and BIF. When applying the 3 factor model of Ford et al. (2014), the average number of ACEs categorised by the factors 'Emotional/physical abuse and neglect', 'Sexual abuse' and 'Household dysfunction' showed that children with BIF experienced more ACEs related to household dysfunction (M = 2.02; SD = 1.18) than children with ID (M = 1.43; SD = 1.11), (U = 1742.0, p = 0.003). Using post-hoc pairwise comparisons between subgroups (severe, moderate, mild ID and BIF) no significant differences were found after Bonferroni correction. As no significant differences were found in age and gender for both the children with ID and BIF, no further analyses were carried out with regard to both the number of ACEs and the 10 original ACE categories.

Using Chi-square tests, the differences between the children with ID and BIF were investigated in terms of the number and the 10 types of ACEs. It was found that children with BIF had more often 2 or more ACEs (X^2 (1, $N = 134$) = 12.234, $p = .000$) or 3 or more ACEs (X^2 (1, $N = 134$) = 9.227, $p = .002$) and they experienced more often emotional neglect (X^2 (1, $N = 134$) = 7.490, $p = .006$) compared to children with ID. On subgroup level children with BIF had more often 2 or more ACEs (X^2 (1, $N = 134$) = 11.126, $p = .004$) or 3 or more ACEs (X^2 (1, $N = 134$) = 8.638, $p = .013$) and they experienced more often emotional neglect (X^2 (1, $N = 134$) = 7.252 $p = .027$) compared to children with moderate or mild ID. Between children with moderate and mild ID no significant differences were found. The prevalence of ACEs in children with severe ID group was relatively low. Because of the small sample size no comparisons with the other subgroups could be made (see 2.4).

Table 3

Descriptives of the family context risk variables.

	Severe ID % (n)	Moderate ID % (n)	Mild ID % (n)	Total ID % (n)	BIF % (n)	Total N % (n)
N	6	20	56	82	52	134
ID parents	0.0 (0)	10.0 (2)	32.1 (18)	24.4 (20)	32.7 (17)	27.6 (37)
Mother	0.0 (0)	5.0 (1)	30.4 (17)	22.0 (18)	25.0 (13)	23.1 (31)
Father	0.0 (0)	5.0 (1)	10.7 (6)	8.5 (7)	**21.2 (11)***	13.4 (18)
ACEs parents	16.7 (1)	25.0 (5)	30.4 (17)	28.0 (23)	38.5 (20)	32.1 (43)
Limited social network	50.0 (3)	20.0 (4)	32.1 (18)	30.5 (25)	32.7 (17)	31.3 (42)
Debts	0.0 (0)	20.0 (4)	26.8 (15)	23.2 (19)	36.5 (19)	28.4 (38)
Housing problems	0.0 (0)	15.0 (3)	3.6 (2)	6.1 (5)	15.4 (8)	9.7 (13)
	1.5	1.65	1.77	1.72	2.19	1.90
Number of residential placements (M)	SD 0.55	SD 1.09	SD 1.36	SD 1.25	SD 1.68	SD 1.45
	RNG 1-2	RNG 1-5	RNG 1-9	RNG 1-9	RNG 1-7	RNG 1-9
Multiple and complex problems family	66.7 (4)	65.0 (13)	71.4 (40)	69.5 (57)	**86.5 (45)***	76.1 (102)

* Significant difference between the BIF group and the total ID group ($p < .05$). No significant differences were found on subgroup level.

Table 4

Pearson correlation coefficients number of ACEs and family context risk variables.

Variable	1	2	3	4	5	6	7
Total ID							
1 Number of ACEs	–						
2 ID parents	.15	–					
3 ACEs parents	.39**	.21	–				
4 Limited social network	.05	.24*	.12	–			
5 Debts	.40**	.16	.24*	.20	–		
6 Housing problems	.11	−.03	.18	.05	.46**	–	
7 Number of residential placements	.35**	.11	.14	.21	.19	.06	–
BIF							
1 Number of ACEs	–						
2 ID parents	.20	–					
3 ACEs parents	.32*	.12	–				
4 Limited social network	−.05	.04	−.13	–			
5 Debts	.23	.32*	.22	.07	–		
6 Housing problems	.33*	.27	−.01	.16	.34*	–	
7 Number of residential placements	.36**	−.01	.05	−.13	.18	.11	–

* Correlation is significant at the .05 (2-tailed) level using bootstrapped confidence intervals.
** Correlation is significant at the .01 (2-tailed) level using bootstrapped confidence intervals.

3.3. Family context risk variables

In Table 3 the prevalence of risk variables related to the family context are shown. It was found that families of children with BIF experienced more often multiple and complex problems (X^2 (1, N = 134) = 5.075, p = .034) and that the father had more often ID (X^2 (1, N = 134) = 4.356, p = .037). No significant differences between children with ID and BIF were found regarding the other family context risk variables. On subgroup level, no significant differences were found between children with moderate ID, mild ID and BIF.

3.4. Relationship between number of ACEs in children and family context risk variables

To explore the relationship between the number of ACEs in children and family context risk variables, point biserial correlations were used (see Table 4). In children with ID, a moderate correlation was found between the number of ACEs and family debts (r_{pb} = .40). Weak correlations were found between the number of ACEs and the presence of 1 or more original ACEs in parents (r_{pb} = .39) and the number of residential placements (r_{pb} = .35). In children with BIF, weak correlations were found between the presence of 1 or more original ACEs in parents (r_{pb} = .32), family housing problems (r_{pb} = .33), the number of residential placements (r_{pb} = .36) and the number of ACEs in children. Phi coefficients were calculated to explore the relationship between the dichotomous family context risk variables. In children with ID, a moderate correlation was found between family housing problems and debts (Φ = .46). Weak correlations were found between family debts and ACEs parents (Φ = .24) and between limited social network and ID of parents (Φ = .24). In children with BIF, weak correlations were found between family debts and housing problems (Φ = .34) and family debts and ID of parents (Φ = .32).

A multiple regression analysis for both children with ID and BIF was used to further analyse the associations between the family context risk variables and the number of ACEs. All independent variables were entered in the model at the same time as there were no hypotheses regarding which variable would create the best prediction equation. It was found that in children with ID, the independent

Table 5

Coefficients multiple regression analysis number of ACEs and family context risk variables.

Variable Total ID	Model 1				
	B	SE B	β	t	Sig.
(Constant)	.865	.309		2.798	.007**
ID parents	.126	.421	.030	.299	.766
ACEs parents	1.148	.402	.287	2.856	.006**
Limited social network	−.430	.392	−.110	−1.096	.277
Number of residential placements	.377	.143	.261	2.632	.010*
Debts	1.470	.479	.346	3.072	.003**
Housing problems	−.830	.814	−.111	−1.020	.311
Variable BIF	B	SE B	β	t	Sig.
(Constant)	1.573	.427		3.679	.001**
ID parents	.340	.462	.098	.737	.465
ACEs parents	1.002	.430	.300	2.333	.024*
Limited social network	−.062	.442	−.018	−.140	.889
Number of residential placements	.305	.124	.312	2.451	.018*
Debts	−.068	.476	−.020	−.143	.887
Housing problems	1.245	.612	.276	2.034	.048*

[*] $p < .05$; using bootstrapped confidence intervals.

[**] $p < .008$; significance after Bonferroni correction; using bootstrapped confidence intervals.

family context risk variables explained 27.1 % (adjusted R square) of the variance in the number of ACEs. In children with BIF, the adjusted R square was 22.3 %. The regression models explained the number of ACEs significantly in both children with ID, $F (6, 75) = 6.012$, $p = .000$, and children with BIF, $F (6, 45) = 3.443$, $p = .007$. In Table 5 it is shown that in the group of children with ID, the independent variables ACEs parents, number of residential placements and family debts significantly explained the number of ACEs in children ($p < .05$). After a Bonferroni correction the variable family debts was no longer found to be significant. Although these independent variables were not significant after a Bonferroni correction, the overall regression model in the group of children with BIF was significant. The results indicate associations between the family variables and the number of ACEs: as the number of family context risk variables increased, the mean number of ACEs tended to increase.

4. Discussion

4.1. Significance of the results

The mean age of the children with ID and BIF in this sample was respectively 11.0 and 11.5 years, yet the current research revealed that they already experienced relatively high levels of adversity in their young lives. Of the children with ID, 81.7 % experienced at least 1 ACE of the 10 ACEs of the original framework Wave II ((Anda et al., 2009)) and of the children with BIF as much as 92.3 %. The accumulation of ACEs was also evident; 36.6 % of the children with ID experienced 3 or more ACEs, as did 63.5 % of the children with BIF. 19.5 % of the children with ID had experienced 4 ACEs or more and 32.7 % of children with BIF. Comparing these prevalence figures with other research results requires caution, as there is a significant variation between studies due to differences in definition, operationalization, populations studied, and variation between countries ((Massetti, Hughes, Bellis, & Mercy, 2020)). In the sparse ACEs research regarding children with ID, it was found that there is a presumed 3–7 times increased vulnerability to experience adversity and in a study among young children with developmental delays 47 % experienced 1 ACE (Mehari et al., 2020). Large NSCH studies regarding adversity among American children show that 23–25 % of the children experienced 1 out 9 measured ACEs (Bright et al., 2016; Cprek et al., 2020; Turney, 2020). A Dutch study among children in regular primary education showed that 45,3 % experienced 1 or more ACEs of the original ACE framework Wave II (Vink et al., 2019). A cautious comparison gives the impression that ACEs prevalence rates among the children in the present study are considerably higher than in the general population. Given the young age of the children in the current study, it is possible they will experience even more ACEs before they reach the age of 18. Comparison of the results of the Santoro et al. study (2018) with the results of the current study shows similar patterns, but in the current study the children with ID have experienced higher rates of parental separation, domestic violence and parental mental health problems than the adults. For both children and adults, the hypothesis of underreporting is plausible. For example, the prevalence of sexual abuse in the compared studies (children with ID 7.3 %; adults with ID 5.7 %) is lower than expected when considering that there is a 4–8 times higher risk for sexual abuse for children with ID (Wissink et al., 2015) and a 7 times higher risk of experiencing sexual assault for adults with ID (Curtiss & Kammes, 2020).

A large percentage of families of the children with ID or BIF daily faced multiple and complex problems: 69.5 % (ID) and 86.5 % (BIF) as opposed to merely 3–5 % of all households in the Netherlands (Knot-Dickscheit & Knorth, 2019). The results show that the more problems families experienced the more ACEs the children experienced. This is in line with the findings from the literature (Scully et al., 2020). The current sample has an increased risk of intergenerational continuity of risks and problems (Schofield et al., 2018), given the relatively high presence of family context risk factors (see Tables 2 and 3) that can make parenthood vulnerable and reduce the likelihood of safe, stable nurturing parent-child relationships.

In a British cohort study (Hassiotis et al., 2019) it was found that children with BIF were significantly more likely than their peers to

be exposed to ACEs. In line with these findings, the present study found that children with BIF experienced on average more ACEs than children with ID. They experienced more often 2 or 3 or more ACEs and their families faced significantly more multiple and complex problems, household dysfunction was more common, the father had more often ID and the children experienced more often emotional neglect. The vulnerability of this group should not be overlooked in education and care.

In terms of poverty as a risk of other adversities as discussed in the introduction, larger percentages of the households in our sample experienced debts (ID: 23.2 %; BIF: 36.5 %), compared to about 15 % of all households in the Netherlands ((Hoff, 2016)). The current study revealed moderate positive correlations between family debts and the number of ACEs in the children with ID and of family debts and the number of ACEs of parents. In the group of children with BIF, weak positive correlations were found between family debts and housing problems and family debts and ID of parents. Improving socio-economic conditions seems to be an important key to reducing the number of ACEs (Walsh, McCartney, Smith, & Armour, 2019).

4.2. Study limitations and strengths

This exploratory study is not without limitations. It was based on a convenience sample ((Massetti, Hughes, Bellis, & Mercy, 2020)) consisting of children with ID or BIF with comorbid developmental, behavioural and psychiatric problems who were admitted to a nationwide specialized centre. Therefore, generalizing the results to other populations of children with ID and BIF should be done with caution because of possible biased estimates. The group of children with severe ID was too small to compare with the results found in the other subgroups. Furthermore, data were retrieved from case-files in which potentially relevant information may not have been administered by (former) professionals or in which relevant information was missed by the professionals as there was no systematic attention to experienced adversities and resilience during the residential placement. Therefore it is plausible that true prevalence rates of ACEs could be even higher, taking into account the alleged vulnerability of these children to experience ACEs. Also it is known that the scope of the original Wave II framework is limited ((Sheridan & McLaughlin, 2020)), which could lead to underexposure of other experienced adversities in children with ID. Strengths of the study are the unique residential convenience sample, the structured, multidisciplinary way in which the case-files were set up, the systematic analysis of the data and the high inter-rater reliability.

4.3. Clinical implications

Increased awareness for the high presence of ACEs and (explaining) family context risk factors in children with ID and BIF is urgently needed in practice, policy and prevention. Unfortunately, childhood adversities are still a seriously overlooked risk factor for persistent behavioural, mental and physical health disparities in children with ID and BIF. This omission in the attention for ACEs increases the risk of social exclusion of these children in key areas such as education and community participation (Emerson, 2013) and may lead to out of home placement and suboptimal results in healthcare an education. Understanding and contextualising the consequences of childhood adversity is necessary for adequate diagnosis, effective, sustainable treatment (Rahman, Perri, Deegan, Kuntz, & Cawthorpe, 2018) and optimal education or day services. An organisational shift to trauma informed care could support this paradigm shift (Piotrowski, 2020). Instead of primarily focussing on the behavioural, mental or physical health of the child with an ID or BIF, a focus on the overall family context and intergenerational transmission of adversity is therefore necessary. An interesting example is the intensive trauma-focused treatment programme for families with PTSD and mild ID (Mevissen, Ooms-Evers, Serra, de Jongh, & Didden, 2020) to prevent out of home placement. Having continuing conversations about life history, sources of stress and strengths, investing in skills to regulate stress and control emotions, and investing in safety and connection are key in care, education and child protection for both the recipient and the provider.

4.4. Future research

Further ACE research concerning children with ID and BIF and their families is highly recommended to keep filling the gaps in knowledge for these vulnerable groups. Focus should be on the range of adversities, their consequences, relationships with possible confounders (e.g. residential disadvantage, socio-economic circumstances) and resilience in relation to effective interventions for their health, wellbeing and future life opportunities. Learning from dialogue with parents, children and care providers is necessary to improve daily practice. Given the intertwining of the health of parents and their children, further research should also focus on childhood adversities of the parents in relation to the development of heir children, protective factors and effective interventions, as interventions that improve parental health can also be directly beneficial for the child and potentially prevent out-of-home placement.

5. Conclusion

ACE awareness should be raised and adequate interventions should be available for children with ID and BIF and their families who can face multiple and complex problems. In a next generation of youth care the main focus should be on treatment of both children and parents, from a family and community-based (Bulic & Anguelova-Mladenova, 2012), systemic (Rhodes et al., 2011), intergenerational (Dube, 2020), and trauma-informed (Piotrowski, 2020) approach. All children should be given the circumstances to reach their full health and life potential (Ports, Ford, Merrick, & Guinn, 2020).

Funding

CRediT authorship contribution statement

Declaration of Competing Interest

Acknowledgements

Appendix A

Table A1
Demographics.

Demographics	Operationalisation in the present study
Age	At admission
Co-morbid clinical disorder	Besides the intellectual developmental disorder, another clinical disorder (DSM 5; (APA, 2013) was diagnosed in the final report (at the end of the admission) by a licensed behavioural scientist (the head of the multidisciplinary team working with the child and the family)
Child protection measure	The child is under supervision by the authorities/guardianship by government/authorization for out-of-home placement.

Table A2
Adverse Childhood Experiences Wave II original framework ((Anda et al., 2009)).

Subscales (Ford et al. (2014)	ACEs Wave II original framework	Operationalisation in the present study *A professional reported in the case-file:*
Emotional/Physical abuse	Physical abuse	the child experienced pushing/beating/grabbing/slapping/kicking or being hit so hard by (one of) the biological parents or primary caregiver(s) that it resulted in marks or injury
	Emotional abuse	the child was sworn at/insulted/threatened or put down by (one of) the biological parents or primary caregiver(s)
	Physical neglect	the parent's or primary caregiver's behaviour interfered with the child's care; wearing dirty clothes/bad hygiene/not enough personal living space/no safe living space/not enough to eat/not taken to a doctor when needed or forced to take care of themselves
	Emotional neglect	the parent(s) or primary caregiver(s) didn't make the child feel special and loved/the family not being a source of strength, protection and support or the child received little attention
Sexual abuse	Sexual abuse	the child was involuntarily touched in a sexual way/forced into any form of sexual contact/forced into watching sexual content by the parent(s) or primary caregiver(s)
	Parental incarceration	a parent or primary caregiver went to prison
	Parental separation or divorce	the biological parents were (temporary) separated or divorced
Household dysfunction	Domestic violence	the father, mother or primary caregiver was (1) pushed, grabbed, slapped, or had something thrown at her/him (2) kicked, bitten, hit with a fist, or hit with something hard (3) repeatedly hit over at least a few minutes (4) threatened with or hurt by a knife or gun
	Parental substance abuse	the parent or primary caregiver used excessive alcohol or drugs
	Parental mental health problems	1) biological parent(s) had mental health problems (symptoms or disorders) interfering with the child's care 2) a parent ever attempted suicide

Table A3

Family context risk variables (Vervoort-Schel et al., 2018).

Family context	Operationalisation in the present study *A professional reported in the case-file:*
Intellectual disabilities parents	The biological father or mother has intellectual disabilities
ACEs parents	the parent(s) experienced at least 1 of the 10 ACEs from the original framework Wave II ((Anda et al., 2009))
Limited social network	the family of the child has a limited social network
Debts	the family in which the child grew up experience(d) debts
Housing problems	the family in which the child grew up experience(d) housing problems
Number of residential or foster care placements	placements of the child in residential or foster care

Table A4

Summary variable "indication of multiple and complex problems in the family".*.

Domains	Family experiences multiple problems for a long time in at least 6 of the 7 domains	Operationalization in the present study
Child Factors (minimum 1)	Psychological or psychosocial problems including developmental problems, behavioural problems, psychosomatic problems and addictions Cognitive problems (such as low IQ and learning difficulties) and intellectual disabilities Victim or witness of assault, abuse, neglect or domestic violence	- All children in the present study experience cognitive problems or intellectual disabilities - All children in the present study experience psychological or psychosocial problems to a greater or lesser extent. - Presence of at least one of the following ACEs: physical/ emotional abuse and/or neglect and domestic violence
Parental factors (minimum 1)	Mental or psychosocial problems including psychosomatic problems, behavioural problems (aggression and criminal behaviour) and addictions Cognitive problems (like low IQ) and intellectual disabilities Victim, witness or perpetrator of assault, abuse, neglect or domestic violence	- Variable Parental mental health problems - Parental incarceration - Variable Intellectual disability biological father or mother - Variable ACE (original framework Wave II; (Anda et al., 2009)) parent/caregiver
Child rearing Factors (minimum 1)	Insufficient or inconsequent parenting strategies Pedagogical impotence Little consistency Little responsiveness A lot of hard discipline Rejection Lack of behavioural control A lot of psychological control Insecure attachment	- To a greater or lesser extent child rearing problems, like a mismatch between needs of the child and parenting strategies, exist when opting for admission at the centre. In the present study these problems aren't further explored.
Family functioning factors (minimum 1)	Relationship problems Conflicts Communication problems Little cohesion External locus of control No organisation	- To a greater or lesser extent family functioning problems, like parent-child relationship or communication problems or conflicts, exist when opting for admission at the centre. In the present study these problems aren't further explored.
Contextual factors (minimum 1)	Multiple negative life events Financial problems Low social-economic status	- Negative life events: all the children and families experienced at least the out-of-home placement and inadequate help prior to the admission - Variable Housing problems - Variable Debts
Social network (minimum 1)	Disrupted or lack of social network Conflicts with local residents and friends	- Variable limited social network - In the present study no information is collected regarding conflicts with local residents or friends
History of support (minimum 1)	Long history of support services Out of home placement	- All children in the present study have a history of support services (admission criteria) - All children in the present study were in residential care

* Translated from the list of 'screening families with multiple and complex problems' (p. 73–74) (Dekovic & Bodden, 2019).

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