










RESEARCH ARTICLE

Early Childhood Violence Exposure Patterns in The Drakenstein Child Health Study (DCHS) [version 1; peer review: 1 approved, 1 not approved]

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Abstract

Background: Research has highlighted high rates of exposure to violence among South African youth. However, work to date has been largely cross-sectional, focused on violence exposure during the adolescence period, and has been limited to specific types of violence exposure. We examined violence exposure in South African preschool children between 3 and 6 years of age, capturing both direct and indirect forms of violence, and tested for potential sex differences across the several types of exposures.

Methods: Lifetime direct and indirect exposure to domestic and community violence was measured by parental report when children were 3.5 years (N = 530), 4.5 years (N = 749) and 6 years of age (N = 417) in a South African birth cohort located in a peri-urban community.

Results: There are three main findings. First, a large proportion of children (72%-75%) were reported as having been exposed to some form of direct or indirect violent experience in their homes or communities from a young age. Second, there was significant polyvictimization, with 49% of the children being exposed to more than one type of violence by age 6. Third, by 4.5 years of age, there was evidence that boys were more likely than girls to be exposed to domestic victimisation (28% vs. 17%) and polyvictimization (38% vs. 28%).

Conclusions: These findings highlight the high levels of violence

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exposure in young South African children, particularly among boys, and the need for prevention at both the community and individual levels.

Keywords

childhood exposure to violence, interpersonal violence, community violence, domestic violence; polyvictimization, South Africa, preschoolers

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Introduction

Research conducted by the WHO indicates that homicide rates of children under the age of 5 years in South Africa (14.0 and 11.7 per 100 000 for boys and girls, respectively) were more than twice as high as the average for low and middle-income countries (LMICs; (Krug *et al.*, 2002). Moreover, the estimated economic burden of violence against children in South Africa is high. In 2015, an estimated 2.3 million disability-adjusted life years (DALYs) were lost in South Africa due to non-fatal violence against children, and 84,287 due to fatal child-focused violence. The estimated economic cost of DALYs lost to violence against children in 2015 was ZAR173 billion (USD 13.5 billion)—or 4.3% of the country's gross domestic product that year (Fang *et al.*, 2017).

The causes of violence in South Africa are multifaceted. It is considered to be embedded in the colonial history and legacy of apartheid as under the apartheid government violence was widely accepted and normalised (Bruce, 2009; Ward *et al.*, 2013). Extensive poverty, inequality, high unemployment rates together with a fragile law enforcement system, the rise of urbanisation, poor housing and education outcomes all play a role in the perpetuation of community violence (Bruce *et al.*, 2007; Seedat *et al.*, 2009). Furthermore, intimate partner violence (IPV) and physical disciplining methods such as corporal punishment are widely tolerated and accepted as social norms and are inter-generationally transferred. For example, in one study, 58% of South African caregivers reported having smacked their children at least once and 33% reported using an object such as a belt (Dawes *et al.*, 2005). A cycle of vulnerability to violence may also exist, with maltreatment among mothers in childhood being linked with an increased risk of experiencing IPV in pregnancy, and adulthood. (outside of pregnancy) (Barnett *et al.*, 2018). Sex differences in violence exposure types have also been reported, where teenage boys have a higher risk of becoming victims of homicide and community violence than girls (Mathews *et al.*, 2013).

Despite compelling evidence of substantial violence exposure among South African youth, and in other LMIC populations, substantial gaps exist in our knowledge. First, existing studies have focused on adolescents rather than younger children, with little evidence on preschool children in particular. Second, most work has been cross-sectional, with few longitudinal studies. Understanding how patterns of violence exposure may change with age is relevant to developing targeted prevention strategies. Third, studies have often focused on single forms of violence exposure (e.g., IPV), and there is a need to explore a range of direct and indirect forms of trauma exposure to provide a full picture of the risks to children. Relatedly, there is limited research on polyvictimization - the phenomenon where individuals are exposed to multiple forms of trauma - despite evidence that polyvictimization is a particular risk factor for poor child outcomes (De Bellis *et al.*, 2013; Finkelhor *et al.*, 2015; Ford, 2021; Haahr-Pedersen *et al.*, 2020a; Kaminer *et al.*, 2013b; Le *et al.*, 2018). Finally, little work has described sex differences in exposure to violence, which may be important to consider in the development of targeted intervention strategies. In sum, a better understanding of research investigating

the exact patterns of violence exposure in the day-to-day lives of preschool children is needed. This is essential in South Africa where interpersonal violence is particularly high.

We addressed the above research gaps using a longitudinal South African birth cohort, the Drakenstein Child Health Study (DCHS), which provides a unique resource for doing so. Previous studies using the DCHS cohort found high levels of IPV and childhood trauma among mothers (Stein *et al.*, 2015). Here we explored the violence exposure patterns in the DCHS children born to these mothers, who consisted of males and females aged between 3 to 6 years, and where both direct and indirect forms of violence were longitudinally measured across three different time points. Sex differences in exposure patterns were also examined as well as the extent of polyvictimisation in this young age group.

Methods

Ethics

All procedures performed were in accordance with the ethical standards of the Medical Research Council in South Africa and with the Helsinki Declaration (2013). The study protocol including consent forms was approved by the Faculty of Health Sciences Research Ethics Committee, University of Cape Town (401/2009), and by the Western Cape Provincial Research committee (2011RP45). Given the content of the CECV scale, a key obligation in the study was to flag instances of abuse, trauma and mental health issues. An active referral system was in place for both mothers and children supported by close relationships between study staff and provincial health staff. Furthermore, all women participating in the study, regardless of specific mental or physical health problems, were informed about social and support service providers available to them.

Study design

The DCHS is a longitudinal study employing a multidisciplinary approach to investigate the early-life determinants of child health in two peri-urban communities in the Drakenstein sub-district of the Cape Winelands, Western Cape, South Africa (Zar *et al.*, 2015). Longitudinal measurements of risk factors in seven domains (environmental, infectious, nutritional, genetic, psychosocial, maternal and immunological) are used to investigate child health in addition to maternal and paternal health. The early-life component of the study centres on a wide range of developmental outcomes in domains that include physical health and growth as well as neurodevelopmental, cognitive and psychological health (Donald *et al.*, 2018).

Study setting

The study population is characterised by low-socioeconomic status (SES) and multiple psychosocial risk factors are prevalent, such as single-parent households, high rates of psychological distress and violence exposure, HIV and illicit drug use, high levels of violence and intimate partner violence (Groves *et al.*, 2015) and low levels of employment and educational achievement (Stein *et al.*, 2015). The population is a stable one, with low immigration or emigration and over 90% of the inhabitants use the public health care systems. In view of the

factors above, the DCHS cohort can be considered representative of other South African and LMICs peri-urban communities.

Participants

Pregnant women were recruited whilst attending one of the two primary healthcare clinics in the area, between March 2012 and March 2015. Pregnant women were enrolled if they were at least 18 years of age, received their antenatal care at either of the two clinics and planned on remaining in the area for at least one year. Mothers who consented were enrolled at 20–28 weeks' gestation and mother-child dyads have been followed longitudinally; to date, the oldest children are 10 years of age. At enrolment, mothers provided informed written consent and were further re-consented annually after childbirth. Mother-child dyads attended follow-up visits at the two clinics and Paarl Hospital (Stein *et al.*, 2015). Trained study staff from the community guided the informed consent process with the mothers in the mothers' language of choice, isiXhosa, Afrikaans or English.

A total of 1137 mother-child dyads were enrolled in the study, from these, four mothers had twins and one had triplets. Therefore, the total number of children who were enrolled in the study is 1143. Due to attrition (see Figure 1 for details), the current sample in the DCHS is 980. All the children were born at the main hospital and child sex was established at birth. Here, sex, classified as female or male, refers to a set of biological

attributes in humans linked with physical and physiological features including chromosomes, gene expression, hormone function and reproductive/sexual anatomy (Coen & Banister, 2012).

Procedures and data collection measures

Sociodemographic characteristics. A questionnaire adapted from the South African Stress and Health (SASH) Study (Myer *et al.*, 2008) was used to collect data on sociodemographic variables such as household income, employment status and education. The questionnaire was administered by trained study staff in interview format antenatally at 28 to 32 weeks' gestation and during annual study visits.

Violence exposure. The Child Exposure to Community Violence Checklist (CECV) is a parent-report measure comprised of 35 items assessing the children's lifetime exposure to domestic, school and community violence.

A standard forward and backward approach (Smit *et al.*, 2006) was used to translate the measure from English to isiXhosa and Afrikaans. Translations were further cross-checked with study staff based in study communities to ensure that the appropriate dialect was used. The measure was administered by trained research assistants in Afrikaans for the Afrikaans-speaking participants and isiXhosa through the aid of interpreters for the isiXhosa-speaking participants.

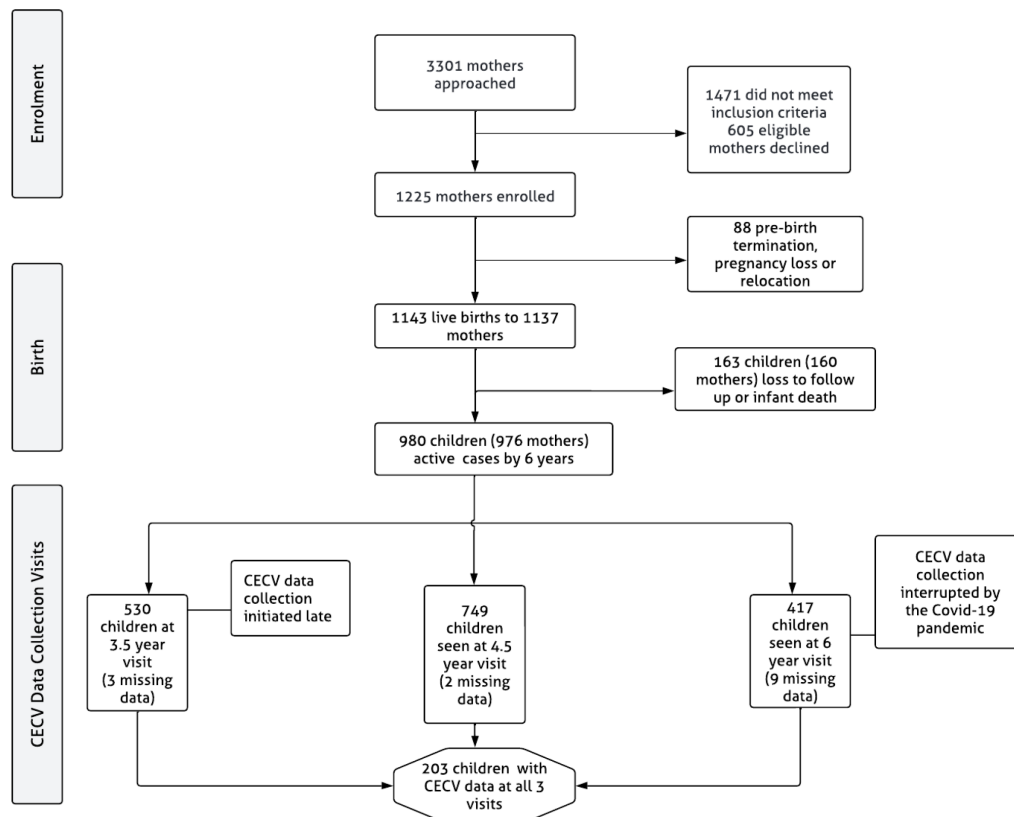


Figure 1. DCHS flowchart for CECV data collection.

The CECV version used in the study was adapted to more correctly target the South African population (Bruwer *et al.*, 2008; Fincham *et al.*, 2009) as well as the study focus. It has shown good psychometric properties such as good internal reliability in previous South African studies such as $r = .93$ (Fincham *et al.*, 2009), $r = .86$ (Kaminer *et al.*, 2013c) and $r = .85 - .87$ (Kaminer *et al.*, 2013a). The checklist is coded on a four-point Likert scale rating the frequency of exposure ranging from “0” (never), to “3” (many times). Here we collapsed the responses to create a binary yes/no indicator of exposure for each item by combining exposure to violence ratings “once”, “a few times” and “many times” to indicate “yes” to violence exposure and retained the rating “never” as an indication of no exposure. This was done to enable us to create subscales and a total exposure score, that clearly reflect the number of types of violence exposures, as opposed to conflating exposure frequency and type.

The total exposure score (*Overall Violence Exposure*, $\alpha = 0.88$) was generated from the CECV by summing over the 35 items with high scores indicating a greater frequency of exposure (range 0–35). We also created four subscales from the CECV items to characterise violence exposure patterns in this cohort, namely, *Witnessing Community Violence* (10 items, $\alpha = .72$), *Community Victimization* (8 items, $\alpha = .75$), *Witnessing Domestic Violence* (6 items, $\alpha = .75$) and *Domestic Victimization* (11 items, $\alpha = .79$) consistent with previous studies that used this measure (Kaminer *et al.*, 2013a; Kaminer *et al.*, 2013c). We defined polyvictimization as a score of 1+ on two or more subscales.

Data analysis

Data analysis was performed using R Statistical Software (version 4.0.2) and R Studio (version 1.3.1073) for Mac. Given that the exact timing of violence exposure was not measured, each timepoint was cross-sectionally analysed. Prevalence of *Overall violence Exposure* and subtypes of violence were descriptively summarised using counts and proportions. We examined the distributions of subscales and *Overall violence Exposure* using the Shapiro-Wilk test of normality. The frequency of polyvictimization was also explored. Chi-square analyses were conducted to explore sex and sociodemographic differences in violence exposure.

Missing data. Item nonresponse occurred on the CECV scale in some of the cases where the CECV was completed at each visit. At the 3.5-year visit ($N = 530$), 3 cases (0.6%) had incomplete data, at the 4.5-year visit ($N = 749$), 2 cases (0.3%) had incomplete data and at the 6-year visit ($N = 417$), 9 cases (2.2%) had incomplete data (Figure 1).

In these cases, item nonresponse was handled by imputing missing values using the single modal imputation method for each measurement occasion separately. Modal imputation was carried out using Base R functions of R Statistical Software (version 4.0.2)

Results

The sample sizes at each age/visit differ from the current total DCHS sample ($N = 980$). This is due to late CECV data collection

initiation at the first study visit (age 3.5), data collection interruptions at the 6-year visit due to the COVID-19 pandemic, and non-response at any one of the time points. Only 203 children completed the CECV at all three visits (Figure 1). Participants' sociodemographic characteristics are summarized in Table 1. The majority of the households are from a low SES, with 49% having a monthly household income between 1000-5000 ZAR (62 – 310 USD), and 38% earning less than 1000 ZAR (62 USD) per month. The majority of children came from single-parent households and lived with on average 4 to 5 people. Furthermore, mothers reported high levels of unemployment and low levels of educational attainment. The distribution of characteristics was similar in participants who attended the 3.5, 4.5- and 6-year clinics and the cohort overall.

Violence exposure patterns

The proportions of children exposed to any form of violence, as well as subscale scores and item level exposure by age at measurement are presented in Table 2. Exposure to any form of violence by each of the visits was 72%, 75% and 76%, at ages 3.5, 4.5 and 6 years respectively. *Witnessing Community Violence* was the most prevalent trauma: (62%, 67% and 69%), followed by *Domestic Victimization* (24%, 23% and 31%), *Witnessing Domestic Violence* (28%, 24% and 21%) and *Community Victimization* (9%, 9% and 14%). Similar prevalence rates are reported in the subsample ($N = 203$) of those participants consistently seen at all visits, see Table 6.

Looking at all three time points, the most prevalent exposures in the *Witnessing Community Violence* subscale were *hearing gunshots* (38% – 48%) and *seeing someone beaten up in the neighbourhood* (41% – 46%). In the *Community Victimization* subscale, the most common exposure was *House robbery occurring whilst the child was present* (4% – 8%). *Seeing grownups fighting* (18% – 26%) was the most common exposure in the *Witnessing Domestic Violence* subscale. The most prevalent *Domestic Victimization* subtypes were the *child being hit by a stick, belt or another hard item at home* (6% – 13%), the *child being shouted at fiercely and loudly by a family member* (8% – 11%) and *child being called horrible names by someone at home* (8% – 13%).

Table 3 provides summary statistics (proportion exposed, median, IQR and range) for the overall violence score and subscales by age and sex. The only evidence for sex differences was seen for reported exposure to *Domestic Victimization* by age 4.5, where more boys than girls had reports of exposure (28% vs. 17%).

Table 4 provides frequencies of violence exposure by marital status, household income and age. There was no evidence of associations between violence exposure and maternal marital status or social economic status (indicated by household income).

Prevalence of polyvictimization

Table 5 reports rates of polyvictimization in the sample by each visit. By the age of 6 years, 49% of participants who were exposed to some form of violence, were exposed to multiple types of violence. Furthermore, sex differences were observed at the 4.5-year visit, where more boys (37%) experienced significantly more lifetime polyvictimization than girls (31%).

Table 1. Demographic profiles and baseline descriptive statistics of the sample stratified by visit.

	3.5 years (N = 530)	4.5 years (N = 749)	6 years (N = 417)	Subsample (N=203)	Full cohort (N = 1137)
Sex					
Female	262 (49%)	371 (50%)	198 (48%)	95 (47%)	550 (48%)
Average household income per month					
<1000 ZAR (62 USD)	179 (34%)	272 (36%)	162 (39%)	76 (37%)	430 (38%)
1000-5000 ZAR (62 - 310 USD)	282 (53%)	388 (52%)	199 (48%)	97 (48%)	553 (49%)
>5000 ZAR (310 USD)	69 (13%)	89 (12%)	56 (13%)	30 (15%)	154 (14%)
Mother's Education					
Primary	38 (7%)	60 (8%)	42 (10%)	8 (9%)	86 (8%)
Some Secondary	292 (55%)	411 (55%)	213 (51%)	100 (49%)	606 (53%)
Completed Secondary	171 (32%)	235 (31%)	146 (35%)	75 (37%)	372 (33%)
Any tertiary	29 (6%)	43 (6%)	16 (4%)	10 (5%)	73 (6%)
Mother's Employment Status					
Unemployed	388 (73%)	560 (75%)	313 (75%)	149 (73%)	831 (73%)
Mother's Partnership status					
Married/cohabiting	223 (42%)	301 (40%)	164 (39%)	77 (38%)	458 (40%)
Number of people in the household					
Median (IQR)	4(3-6)	5 (3-6)	4 (3-6)	4(3-6)	4 (3-6)

Table 2. Prevalence of Exposure to Specific Violence Types at Each Study Visit.

	3.5 years (N = 530)	4.5 years (N = 749)	6 years (N = 417)
	Exposure at Least Once		
Exposure to any form of violence	383 (72.3%)	562 (75.0%)	318 (76.3%)
<i>Witnessing community violence</i>	329 (62.1%)	499 (66.6%)	287 (68.8%)
Heard gunshots	199 (37.5%)	315 (42.1%)	201 (48.2%)
Seen someone beaten up in the neighbourhood	219 (41.3%)	341 (45.5%)	184 (44.1%)
Seen dead body in the neighbourhood	35 (6.6%)	64 (8.5%)	39 (9.4%)
Seen somebody point a gun at another in the neighbourhood	31 (5.8%)	42 (5.6%)	34 (8.2%)
Seen somebody get shot in the neighbourhood	8 (1.5%)	22 (2.9%)	22 (5.3%)
Seen somebody point a knife at another in the neighbourhood	75 (14.2%)	119 (15.9%)	72 (17.3%)
Seen somebody get stabbed in the neighbourhood	47 (8.9%)	65 (8.7%)	50 (12.0%)
Seen someone forced to do something sexual neighbourhood	3 (0.6%)	1 (0.1%)	7 (1.7%)
Child known someone killed by another	15 (2.8%)	30 (4.0%)	22 (5.3%)
Seen someone being killed by another person elsewhere	7 (1.3%)	11 (1.5%)	9 (2.2%)

	3.5 years (N = 530)	4.5 years (N = 749)	6 years (N = 417)
Community victimisation	45 (8.5%)	68 (9.1%)	58 (13.9%)
House robbery child present	24 (4.5%)	27 (3.6%)	34 (8.2%)
Someone threatened to beat up the child at school or creche	12 (2.3%)	14 (1.9%)	22 (5.3%)
Someone threatened to beat up the child elsewhere	12 (2.3%)	15 (2.0%)	13 (3.1%)
Child been beaten up elsewhere	7 (1.3%)	22 (2.9%)	13 (3.1%)
Someone elsewhere threatened to kill the child	1 (0.2%)	3 (0.4%)	4 (1.0%)
Someone at school or creche threatened to shoot or stab the child	2 (0.4%)	1 (0.1%)	7 (1.7%)
Someone elsewhere threatened to shoot or stab the child	2 (0.4%)	1 (0.1%)	5 (1.2%)
Someone shot or stabbed the child elsewhere	2 (0.4%)	1 (0.1%)	4 (1.0%)
Witnessing domestic violence	147 (27.7%)	179 (23.9%)	86 (20.6%)
Seen grownups at home hit each other	138 (26.0%)	169 (22.6%)	73 (17.5%)
Seen somebody point gun at another at home	10 (1.9%)	5 (0.7%)	10 (2.4%)
Seen someone at home get stabbed	21 (4.0%)	22 (2.9%)	22 (5.3%)
Seen someone at home get shot	3 (0.6%)	2 (0.3%)	5 (1.2%)
Seen someone forced to do something sexual	2 (0.4%)	2 (0.3%)	9 (2.2%)
Seen someone being killed by another person at home	2 (0.4%)	7 (0.9%)	6 (1.4%)
Domestic victimisation	125 (23.6%)	169 (22.6%)	130 (31.2%)
Someone threatened to beat up the child at home	12 (2.3%)	15 (2.0%)	25 (6.0%)
Child been beaten up at home	12 (2.3%)	16 (2.1%)	15 (3.6%)
Someone at home threatened to kill the child	4 (0.8%)	3 (0.4%)	8 (1.9%)
Family member threatened to shoot or stab the child	1 (0.2%)	1 (0.1%)	5 (1.2%)
Someone shot or stabbed the child at home	2 (0.4%)	3 (0.4%)	4 (1.0%)
Someone made the child do something sexual	5 (0.9%)	6 (0.8%)	10 (2.4%)
Family member shouts at the child fiercely and loudly	60 (11.3%)	60 (8.0%)	39 (9.4%)
Anyone at home used a stick or belt or hard item to hit the child	34 (6.4%)	50 (6.7%)	54 (12.9%)
Anyone at home hit the child so hard they were hurt	19 (3.6%)	26 (3.5%)	23 (5.5%)
Anyone at home said the child would be sent away or kicked out	12 (2.3%)	17 (2.3%)	31 (7.4%)
Anyone at home called the child horrible names	43 (8.1%)	66 (8.8%)	53 (12.7%)

Discussion

In this South African birth cohort, we found that a large proportion of children (72%–75%) were exposed to direct and indirect violent experiences in their homes as well as in the community from a very young age with substantial numbers experiencing polyvictimization. Boys and girls were similarly

exposed to violence overall, but there was some evidence that boys were more vulnerable to *Domestic Victimization* and polyvictimization by age 4.5 years of age.

By the age of 3.5 years, 72% of the children in this cohort had been exposed to some form of violence with *Witnessing*

Table 3. Prevalence of forms of violence by each visit stratified by sex. *p*-value: Chi-square test

	3.5 Years (N = 530)			4.5 Years (N = 749)			6 Years (N = 417)		
	Female (n = 262)	Male (n = 268)	<i>p</i> -value	Female (n = 371)	Male (n = 378)	<i>p</i> -value	Female (n = 198)	Male (n = 219)	<i>p</i> -value
Overall Violence Exposure									
Exposed	179 (68%)	203 (77%)	0.07	273 (74%)	288 (76%)	0.46	148 (75%)	164 (75%)	1.00
Min / Max	0 / 35	0 / 15		0 / 14	0 / 35		0 / 34	0 / 35	
Med (IQR)	1 (0;3)	2 (1;3)		1 (0;2)	2(1;3)		1(1;3)	2(1;4)	
Witnessing Community Violence									
Exposed	153 (58%)	175 (65%)	0.12	237 (64%)	261 (69%)	0.16	129 (65%)	154 (70%)	0.31
Min / Max	0 / 10	0 / 8.0		0 / 6	0 / 10		0 / 9	0 / 10	
Med (IQR)	1 (0;2)	1.0 (0;2)		1(0;2)	1 (0;2)		1 (0;2)	1 (0;3)	
Community Victimisation									
Exposed	19 (7%)	24 (9%)	0.58	28 (8%)	39 (10%)	0.23	19 (10%)	32 (15%)	0.16
Min / Max	0 / 8	0 / 3.0		0 / 2	0 / 8		0 / 8	0 / 8	
Med (IQR)	0 (0;0)	0 (0;0)		0 (0;0)	0 (0;0)		0 (0;0)	0 (0;0)	
Witnessing Domestic Violence									
Exposed	66 (25%)	80 (30%)	0.27	82 (22%)	96 (25%)	0.33	39 (20%)	41 (19%)	0.90
Min / Max	0 / 6	0 / 4		0 / 4	0 / 6		0 / 6	0 / 6	
Med (IQR)	0 (0;1)	0 (0;1)		0 (0;0)	0 (0;1)		0 (0;0)	0 (0;0)	
Domestic Victimisation									
Exposed	54 (21%)	69 (26%)	0.19	64 (17%)	104 (28%)	0.001	51 (26%)	73 (33%)	0.11
Min / Max	0 / 11	0 / 6		0 / 5	0 / 11		0 / 11	0 / 11	
Med (IQR)	0 (0;0)	0 (0;1)		0 (0;0)	0 (0;1)		0 (0;1)	0 (0;1)	

Community Violence as the most prevalent form of violence reported. This is consistent with the reports of high homicide rates and gang-related violence in the Western Cape region ([South African Police Service, 2021](#)). Other studies with older children in the Western Cape also reported high exposure to community violence. One study found that 98.9% of their sample (aged 12-15 years) had witnessed community violence ([Kaminer et al., 2013b](#)) whilst another found that 84.1% of their sample (*Mean* age = 14.2 years) had been exposed to violence ([Stansfeld et al., 2017](#)). A study providing national estimates of trauma exposure in South African adults also found high levels of witnessing violence ([Atwoli et al., 2013](#)), suggesting that this form of trauma is potentially pervasive across the life span in some South African contexts.

Domestic violence was also commonly reported, consistent with earlier reports on IPV during pregnancy in this cohort ([Barnett et al., 2018](#)). Similar prevalence estimates (20% - 31%) were reported on average for both witnessed domestic violent

acts as well as violent acts directed at the child at home. Finding that reports of witnessed domestic violence decreased with age, unlike the other forms of violence, may however suggest underreporting of IPV. IPV and domestic violence are typically considered private matters and rely on people feeling able to divulge this sensitive information. Nonetheless, child exposure to IPV is limited, despite its occurrence; or many caregivers may be of the impression that their children are not being exposed to violence in the home, nor attending to or being affected by the incidences of IPV and domestic violence in the family. Furthermore, children's social-emotional and cognitive development becomes more apparent to caregivers as the children grow older such that parents may appreciate the impact of domestic violence on the children and as such underreport children's exposure to it.

Although *Community Victimisation* is the least prevalent form of reported violence exposure in these early years, it is likely to increase in prevalence as the children get older and spend

Table 4. Violence Exposure by Marital Status and Household Income. *p*-value: Chi-square test

	Overall Violence Exposure		Witnessing Community Violence		Community Victimization		Witnessing Domestic Violence		Domestic Victimization	
3.5 years (N = 530)										
	Exposed (n = 382)	<i>p</i> -value	Exposed (n = 328)	<i>p</i> -value	Exposed (n = 43)	<i>p</i> -value	Exposed (n = 146)	<i>p</i> -value	Exposed (n = 123)	<i>p</i> -value
Mother's Marital Status										
Married/cohabiting (n = 223)	170 (76%)	0.09	143 (64%)	0.41	22 (10%)	0.27	65 (29%)	0.55	54 (24%)	0.72
Single (n = 307)	212 (69%)		185 (60%)		21 (7%)		81 (26%)		69 (22%)	
Household Income										
< R1000/m (n = 179)	133 (74%)	0.59	121 (68%)	0.15	10 (6%)	0.15	46 (26%)	0.62	40 (22%)	0.54
R1000-5000/m (n = 282)	198 (70%)		167 (59%)		24 (9%)		78 (28%)		70 (25%)	
>R5000/m (n = 69)	51 (74%)		40 (58%)		9 (13%)		22 (32%)		13 (19%)	
4.5 years (N = 749)										
	Exposed (n = 561)		Exposed (n = 498)		Exposed (n = 67)		Exposed (n = 178)		Exposed (n = 168)	
Mother's Marital Status										
Married/ cohabiting (n = 301)	230 (76%)	0.49	202 (67%)	0.83	23 (8%)	0.37	78 (26%)	0.30	61 (20%)	0.28
Single (n = 448)	331 (74%)		296 (66%)		44 (10%)		100 (22%)		107 (24%)	
Household Income										
< R1000/m (n = 272)	207 (76%)	0.82	185 (68%)	0.65	26 (10%)	0.50	58 (21%)	0.49	64 (24%)	0.09
R1000-5000/m (n = 388)	287 (74%)		252 (65%)		36 (9%)		97 (25%)		77 (20%)	
>R5000/m (n = 89)	67 (75%)		61 (69%)		5 (6%)		23 (26%)		27 (30%)	
6 years (N = 417)										
	Exposed (n = 312)		Exposed (n = 283)		Exposed (n = 51)		Exposed (n = 80)		Exposed (n = 124)	
Mother's Marital Status										
Married/ cohabiting (n = 164)	125 (76%)	0.68	113 (69%)	0.80	19 (12%)	0.87	30 (18%)	0.81	50 (30%)	0.87
Single (n = 253)	187 (74%)		170 (67%)		32 (13%)		50 (20%)		74 (29%)	
Household Income										
< R1000/m (n = 162)	118 (73%)	0.21	103 (64%)	0.17	22 (14%)	0.77	29 (18%)	0.61	41 (25%)	0.16
R1000-5000/m (n = 199)	156 (78%)		144 (72%)		22 (11%)		42 (21%)		68 (34%)	
>R5000/m (n = 56)	38 (68%)		36 (64%)		7 (12%)		9 (16%)		15 (27%)	

more time outside the home. Indeed other studies conducted in South Africa in older children found this type of violence highly prevalent in adolescents (Haahr-Pedersen *et al.*, 2020a; Kaminer *et al.*, 2013d). The finding that a majority of

children were exposed to community violence from as young as 3.5 years of age is particularly concerning, given associations between community violence exposure and later aggression (Grasso *et al.*, 2016), other mental health problems including

Table 5. Prevalence of Polyvictimization Stratified by Sex. *p*-value: Chi-square test.

Polyvictimization	3.5 years (N = 530)			4.5 years (N = 749)			6 years (N = 417)		
	Female (n = 262)	Male (n = 268)	<i>p</i> -value	Female (n = 371)	Male (n = 378)	<i>p</i> -value	Female (n = 198)	Male (n = 219)	<i>p</i> -value
Any Polyvictimization	80 (31%)	99 (37%)	0.14	105 (28%)	145 (38%)	0.00	64 (32%)	91 (42%)	0.06
Number of different types of violence exposure									
None	82 (31%)	65 (24%)	0.32	98 (26%)	89 (24%)	0.01	48 (24%)	51 (23%)	0.25
One type	98 (37%)	104 (39%)		168 (45%)	143 (38%)		84 (42%)	72 (33%)	
Two types	52 (20%)	60 (22%)		75 (20%)	91 (24%)		42 (21%)	56 (26%)	
Three types	24 (9%)	32 (12%)		27 (7%)	41 (11%)		18 (9%)	29 (13%)	
Four types	6 (2%)	7 (3%)		3 (1%)	14 (4%)		6 (3%)	11 (5%)	

Table 6. Prevalence of Violence Exposure in Subsample.

	3.5 years	4.5 years	6. years
N = 203			
Subscales			
Overall Violence Exposure	153 (75.4%)	148 (72.9%)	146 (71.9%)
Witnessing Community violence	132 (65.0%)	136 (67.0%)	134 (66.0%)
Community victimisation	12 (5.9%)	16 (7.9%)	26 (12.8%)
Witnessing Domestic Violence	56 (27.6%)	46 (22.7%)	36 (17.7%)
Domestic Victimization	49 (24.1%)	45 (22.2%)	59 (29.1%)

Values indicate proportions of those with reports of violence exposure only

posttraumatic stress disorder (PTSD) and internalising and externalizing behavioural problems in children and adolescents, respectively (Fowler *et al.*, 2009).

Polyvictimization was reported in this cohort, especially at the 6.5-year visit, where 49% of the children were reported to have been exposed to more than one type of violence, while at the 3.5- and 4.5-year visits the prevalence rates were 34% and 33% respectively. The higher prevalence at the later visit is possibly a result of older children being exposed to different settings beyond the family home such as school and the community where they may experience violence in these contexts in addition to that in the domestic environment. Indeed, even higher polyvictimization prevalence has been reported in older children, for example, 93% of adolescents aged 12-15 years reported experiencing polyvictimization in a Cape Town study (Kaminer *et al.*, 2013b) whilst another more recent national South African study reported polyvictimization in 64% adolescents aged 15 - 17 years (Leoschut & Kafaar, 2017). Finding high rates of polyvictimization in our sample of such young children is important, given that research has shown that polyvictimization may contribute to the experience of cumulative

stress, aggravating later health outcomes and potentially altering developmental trajectories (Appleyard *et al.*, 2005; Teicher *et al.*, 2006). Furthermore, polyvictimization has been found to be a stronger risk factor for mental health problems than single forms of victimization (Haahr-Pedersen *et al.*, 2020b).

More boys than girls in this cohort were reportedly exposed to polyvictimization by age 4.5 years. Studies have reported mixed findings regarding the relationship between sex and children's exposure to violence. While our study used parent reports, other studies using self-report measures also found that older boys reported more exposure to violence than girls (Falconer *et al.*, 2021; Kaminer *et al.*, 2013b; Kaminer *et al.*, 2013d; Shields *et al.*, 2008) whilst others found no differences in reported exposure to violence (Asagba *et al.*, 2021; Finkelhor *et al.*, 2015; Sternberg *et al.*, 2006). Although research on sex differences in polyvictimization prevalence patterns is very limited, one other study also found that polyvictimization was higher in boys in their sample of adolescents aged 12-15 years living in Cape Town (Kaminer *et al.*, 2013b). Differential socialization of the sexes may explain this discrepancy as boys may be less protected than girls, allowing them to spend more time

outside the home, making them more vulnerable to other forms of violence. There was also some evidence in our study that boys experience more domestic victimisation, suggesting there could also be differences in parental perceptions of the suitability of harsh discipline practices for girls versus boys. Some studies have shown that boys are punished more frequently than girls due to differences in gender roles and expectations between the two sexes (see review by [Lokot et al., 2020](#)). Here, gender refers to the socially constructed roles, behaviours and identities of female, male and gender-diverse people ([Coen & Banister, 2012](#)).

South Africa's political history of oppression and the structural and socioeconomic inequalities that have persisted in society are likely to contribute to the high levels of violence in these communities. These rates of violence exposure may not be generalisable to all South African communities. However, this cohort is representative of many communities in low and middle-income countries, with high rates of poverty, unemployment, and low levels of educational attainment among women. Given that the majority of studies reporting on children's exposure to violence have mostly used samples of older children ([Falconer et al., 2021](#); [Hillis et al., 2016](#); [Hinsberger et al., 2016](#); [Kaminer et al., 2013b](#); [Kaminer et al., 2013d](#); [Shields et al., 2008](#)) finding that violence exposure is common in this sample of pre-schoolers suggests that many children experience the persistent threat of violence throughout the life course and importantly, during early formative years.

Finding no evidence of associations between violence exposure and maternal marital status or socioeconomic status in this cohort suggests that children in our study are similarly exposed to violence regardless of their background. This may be expected given that the DCHS children live in similar contexts where community violence is a common phenomenon. Furthermore, certain types of violence such as intimate partner violence and corporal punishment are widely accepted in the South African society ([Mathews et al., 2014](#)). As such, children in our sample are exposed to similar rates of domestic violence regardless of their mother's socioeconomic context.

The findings of this study should be considered in view of some methodological limitations. Firstly, only a subsample of children was consistently seen at all three visits, such that the sample sizes differ at each visit and comprise different children. Secondly,

there is no information about the exact timing of exposure to violence. Thirdly, given that violence exposure relied on caregiver reports and recall; exposure was likely underreported due to social desirability biases. This is a common limitation of studies that examine trauma exposure or maltreatment in children given that young children are unlikely to be developmentally capable of understanding the concept of a 'violent act' and reporting it adequately ([Shahinfar et al., 2000](#)). Furthermore, obtaining reports of violence exposure from young children may risk re-traumatising them. The high prevalence rates of violence exposure reported are particularly important given the likelihood of underreporting in some domains. Lastly, given that the six year visit had the smallest sample, the power to detect sex differences in polyvictimization exposure patterns is limited.

Conclusion

These findings further highlight the high levels of violence exposure in South African children. They indicate that many pre-schoolers in our sample experience a pervasive threat of danger in their homes and communities. Interventions aimed at the community, family and individual levels, are crucial, not only to stop the cycle of violence but to help children deal with this trauma. Interventions aimed at building resilience in children may help them adapt psychologically. Over and above this, systematic factors that likely contribute to this picture such as poverty, socioeconomic inequality, high unemployment rates, low levels of educational attainment and weak police enforcement need to be mitigated to change this picture.

Data availability

[Drakenstein Child Health Study](#) is committed to the principle of data sharing. De-identified data will be made available to requesting researchers as appropriate. Requests for collaborations to undertake data analysis are welcome. Researchers who are interested in collaborations can find more information on our [website](#).

Acknowledgements

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This is an impressive and important study which is, on the whole, clearly reported. In it, the team have recruited mothers at 20-28 weeks gestation and followed up their children at 3.5, 4.5 and 6 years of age using a parent-report measure of the child's lifetime exposure to domestic, school and community violence. As the authors state, there is a major international evidence gap regarding child development in the preschool years, since most longitudinal studies on "young people" focus on adolescents. Yet, as has been demonstrated by other authors, exposure to negative environments in the very early years can set a child on a trajectory towards violence (Waller *et al*, 2017¹). Prospective longitudinal studies beginning in early childhood are rare in low to middle income contexts which makes the Drakenstein cohort particularly precious.

Methods of recruitment were robust and well described, although small details could further improve reporting to demonstrate this even more clearly. For example, in the Figure 1 flow diagram, it would be helpful to include an additional box, between "approached" and "enrolled" for "eligible" and to include percentages, since this would show that the team were successful in recruiting nearly 70% of those eligible to take part and that, of the 980 active cases, they were able to assess 54% of the children at 3.5 years of age. For such a socially fragmented, high risk, community this is very impressive. The Results are generally very clear although, on page 5, (Results first paragraph) it would be helpful to make a clear statement that draws the reader's attention to Table 1, which shows that the sample of 203 children with data at all three timepoints is highly representative of the full cohort. I also wonder whether the data in Tables 5 and 6 might be better displayed in histograms which would allow for easier comparison across gender and timepoints. It might also have been helpful to see the data in Table 6 presented by sex, although as the authors note the numbers would probably have been too small for inferential statistics to be useful.

The Discussion is clear and compelling and the findings are important for public policy in South Africa and also internationally. The findings show that the history of colonialisation and apartheid has had a devastating impact on the Drakenstein community and, no doubt, similar findings would be found in many post-colonial LMIC across the world. The focus on polyvictimisation was

important, especially in highlighting the burden of violence exposure and the gender differences. Even though a minority of young children in the cohort have experienced any one type of violence exposure, 72% have experienced violence exposure of some kind by age 6. Since previous research has shown that there seems to be a tipping point for greatly increased risk of developing aggressive or violent behaviours around age 2 years (Waller et al 2017¹; King et al 2023²), a strong international focus on preventing violence exposure, especially in babies and young children, is warranted if this intergenerational pattern is to be broken. A strong early childhood health and social care focus is likely to be necessary if communities like Drakenstein are to recover from colonisation and apartheid.

Although the authors make important points about their findings clearly, and place them sensibly in the context of the international literature, there are one or two things it might be worth them considering in addition:

- In Table 2 and, as the authors point out in the Discussion (page 8, second para), there is an interesting opposite trend in which reports of children witnessing parents hitting one another are more common for younger children, compared to other forms of violence exposure which are more commonly reported for older children. The authors rightly suggest that social desirability might be the explanation. An alternative/additional explanation might be that caring for younger children is more challenging/stressful for parents leading to a higher risk of domestic violence, so that children might actually be at greater risk of witnessing domestic violence at younger ages.
- The authors suggest social desirability as an explanation for possible under-reporting of violence exposure in younger children – a very sensible point. An alternative/additional explanation might be the tendency of adults to under-estimate the degree to which young children have been aware of violence which occurred in other parts of the house, or after the child went to bed. Therapists working with young children with PTSD have sometimes found them to have witnessed more than parents and other family members had realised.

Both of these additional points only make the international policy case for an early years focus on violence prevention even stronger.

In summary, this is an impressive account of an important study and I look forward to seeing further publications in which the authors examine the associations between violence exposure and other variables as the children develop.

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Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: I am a child psychiatric epidemiologist and trialist with an interest in the psychopathology associated with abuse and neglect.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 03 Sep 2023

Lucinda Tsunga

Thank you very much for your very helpful comments on our descriptive paper. We have update the manuscript as follows:

Percentages have been added to the figure to highlight that 67% of the eligible participants were included.

We have also included in the description of the sociodemographic data that the 203 children have similar sociodemographic characteristics to the rest of the cohort.

We have added the suggested alternative explanations for the pattern of decrease in domestic violence exposure in the discussion. Indeed, histograms would have added another comparative element through visualisation, however we feel that the tables are better for our purposes of describing exposure patterns as frequencies are clearly presented in the tabular format.

Competing Interests: No competing interests were disclosed.

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This manuscript describes a study of violence exposure among South African youth. The strengths of the study include its focus on youth aged 3 and 6 years and the collection of longitudinal data of both direct and indirect and domestic and community violence exposure as well as polyvictimization. However, the potential impact on the field is significantly limited by several factors. First, the participants were a non-random, voluntary sample. Nearly 20% of the individuals who were approached declined to participate. Thus, the original sample is potentially biased in an unknown direction.

Second, only 203 of the original sample were evaluated at all three visits (3.5, 4.5, 6 years). This increases the possibility of sampling bias. The sampling bias may have also be fostered by administering the study instrument by in-person interviewers. As a result, social desirability may have influenced participant responses. In addition, since child violence exposure was assessed via caregiver report and recall, it is not clear whether child exposure or caregiver exposure was actually assessed in the study and/or whether caregiver exposure to domestic violence may influence the likelihood of accurate reporting.

An additional concern is the failure in the study to fully address the potential role of racial discrimination as a form of violence exposure. For example, the article did not describe the racial/ethnic identity of the participants and the study did not assess historical and/or current racial discrimination. This is potentially problematic since existing data on polyvictimization indicates that exposure to racial discrimination among South African youth may exacerbate the impact of exposure to other types of violence. It is also possible that exposure to the violence of racism may influence caretaker perceptions of other types of violence exposures and increase the likelihood of violence in the home and community. Since the life experiences of individuals in South Africa were and continue to be significantly influenced by their racial categorization, it is not clear why perceived racial identification of participants was not identified in the manuscript.

Third, a more robust data analyses of the variables would have improved the study. Rather than chi square, for example, regression or profile analyses could have been utilized. As the manuscript notes, there may have been insufficient power to test some hypotheses in the sample at 6 years. There is also a lack of clarity on whether all the possible covariates such as illegal drug use were included in the analyses.

Fourth, there is little discussion of the impact of exposure to violence in the context of the development of 3-6 years olds. For example, the manuscript would have been improved had the authors speculated on the potential differences of first exposure at 3-6 versus first exposure at adolescence. This would have strengthened the potential importance of the findings for child development theory.

In summary, given the number and significance of the limitations of this study, it is unlikely that the work will contribute to the growth of the field.

Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

No

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

No

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Child development, violence exposure, and racism in secondary social groups.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 03 Sep 2023

lucinda tsunga

Thank you for your review and comments on our descriptive paper. Which we have addressed, and below we report detailed response to your concerns and outlined how we have amended our manuscript in light of this:

Our study is a longitudinal prospective birth cohort, and as such, it aims to follow a group of individuals from birth throughout their lives to understand various aspects of health and development. The sample presented all participants who were available and eligible for enrolment during a particular time period thus randomization was not a consideration in our sample selection. Despite this limitation, we successfully recruited nearly 70% of those eligible to take part, which demonstrates a commendable effort in engaging and involving a substantial portion of the target population. In a socially fragmented and high-risk community, achieving such a participation rate is a significant accomplishment and adds value to the study's findings. We have updated the flow diagram to indicate percentages as a way of highlighting this. Furthermore, the study has shown low attrition rates with 980

children being active at the 6 year visit. While only a 749 children attended the 4.5 year CECV visit, similar attendance rates are reported at other study visits. Reasons for missing study visits include, caregivers temporarily moving out of the area and mother's unavailability due to employment obligations.

Regarding the issues of sampling bias you have highlighted: Table 1, shows that the sample of 203 children with data at all three timepoints is highly representative of the full cohort. We have now added this description in the text. Furthermore, supplementary table 1 shows how violence exposure patterns of the 203 are similar to the patterns of the children reported in the main analysis.

We acknowledge that our violence exposure measure was conducted through in-person interviews, and this method may have introduced some level of bias. Participants' willingness to participate and provide responses could have been influenced by various factors, including social desirability. This method of gathering data is common in research contexts such as the one in our study with low literacy levels (see Sociodemographics).

As such, having an interview format allowed further clarification where needed. We now have included this explanation in our methods. Our research team took several measures to ensure the participants' comfort and reduce the impact of social desirability on responses. During the recruitment process, research assistants (psychology postgraduate students) were trained to be neutral, non-judgmental, and empathetic, creating a safe and non-threatening environment for the participants. We emphasized the voluntary and confidential nature of their participation to encourage honest and candid responses. This relationship has no doubt contributed to the low attrition rates in the study. We further discuss the impact of social desirability as a limitation but also highlight that despite this, the prevalence of violence in our sample is still significant.

Regarding the clarity of who's reporting on violence exposure and the likelihood of accurate reporting, as described under methods, the CECV questions asked caregivers about their child's exposure to violence. More specifically, parents' awareness of their children's exposure. In the discussion, we highlighted the limitation that children's exposure may be underreported due to social desirability. Furthermore, we discuss the issues surrounding children that age reporting on violence exposure. Indeed we did not investigate racial discrimination as a form of violence exposure, a limitation of the CECV. We have now added this as a limitation.

Regarding our lack of disclosure of the racial (self-identified ancestry) composition of our sample, we made a decision not to focus on race in relation to violence patterns. Given the extensive history of race being used as a powerful dividing force in South Africa as part of the Apartheid Government, we did not want to perpetuate this practice. Instead, we focused on socioeconomic inequalities in relation to violence exposure patterns, with the majority of our sample belonging to a lower socioeconomic class given that evidence suggests higher levels of violence in contexts with high levels of socioeconomic inequality. South Africa being a good example of this. We have now added the racial composition of the sample merely as an additional descriptor of our sample. In this way we highlight the socioeconomic challenges that persist in the communities where our sample reside. These

challenges are a product of the Apartheid Government which systematically segregated South African people on the basis of ancestry profoundly affecting various socioeconomic aspects of their lives. Given that the focus of the study was descriptive, chi-square analyses were deemed sufficient and do not require confounding control as such we did not look at many correlates. In our analyses we did look at three sociodemographic factors in relation to violence exposure patterns, namely, child sex, maternal marital status and household income. Evidence has shown previously how children can differ in terms of their violence exposure status based on these factors. While data on other factors is present in the DCHS, such analyses are beyond the scope of this paper. The intention of this paper was to detail the violence exposure in this cohort and the range of other environmental and psychosocial risks. We needed to give the exposure to violence in young children a particular focus because it has not been widely reported before. Furthermore, analyses of the violence exposure measure in this paper provided context for this data to be used in more integrated analysis in the future. Indeed, we did not discuss the impact of violence in 3-6 year old or in relations to adolescence. We have now added this aspect in the discussion.

Competing Interests: No competing interests were disclosed.
