

# Long-term Psychiatric Impact of Peer Victimization in Adults Born at Extremely Low Birth Weight

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abstract

**BACKGROUND:** While children born at extremely low birth weight (ELBW; <1000 g) are at elevated risk for peer victimization, no research has examined its effects on mental health in adulthood.

**METHODS:** ELBW survivors and matched normal birth weight (NBW; >2500 g) controls were part of a prospective, population-based study in Ontario, Canada. Peer victimization before age 16 was self-reported at age 22 to 26 years by using a 10-point measure. Presence of psychiatric disorders was examined at age 22 to 26 years (ELBW  $n = 142$ , NBW  $n = 133$ ) and age 29 to 36 years (ELBW  $n = 84$ , NBW  $n = 90$ ).

**RESULTS:** After adjustment for confounding variables, for each 1-point increase in the peer victimization score, ELBW survivors had increased odds of current depressive (odds ratio [OR] = 1.67, 95% confidence interval [CI], 1.23–2.28), anxiety (OR = 1.36, 95% CI, 1.05–1.76), avoidant (OR = 1.39, 95% CI, 1.08–1.79), antisocial (OR = 1.92, 95% CI, 1.06–2.87), and attention-deficit/hyperactivity (OR = 1.39, 95% CI, 1.06–1.83) problems at age 22 to 26 years. At age 29 to 36 years, peer victimization score predicted increased odds of current panic disorder (OR = 1.69, 95% CI, 1.01–2.83) and obsessive-compulsive disorder (OR = 3.56, 95% CI, 1.25–10.09). For NBW controls, peer victimization predicted increased odds of antisocial problems at age 22 to 26 years.

**CONCLUSIONS:** ELBW survivors and NBW participants are vulnerable to the adverse psychiatric effects of childhood peer victimization in adulthood.



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**WHAT'S KNOWN ON THIS SUBJECT:** Although children born extremely low birth weight (ELBW) are at increased risk for peer victimization, and peer victimization is associated with poorer psychiatric outcomes, no research has investigated how peer victimization in ELBW youth affects psychiatric well-being in adulthood.

**WHAT THIS STUDY ADDS:** Parents, educators, and physicians should be aware that children born at ELBW are at greater risk for peer victimization and that this significantly increases their risk of psychiatric disorders in adulthood, and that they should intervene when possible.

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Exposure to peer victimization (ie, bullying) can have significant and lasting adverse effects.<sup>1-3</sup> Peer victimization is repetitive and intentional aggressive behavior that occurs between people of unequal power status<sup>4</sup> and is common, with up to one-third of children worldwide having been exposed.<sup>5</sup>

Experiencing peer victimization predicts higher levels of psychiatric disorders in childhood, adolescence, and adulthood.<sup>1,2,6-9</sup> Being a victim increases the risk of developing generalized anxiety disorder, panic disorder, and agoraphobia by 2 to 5 times.<sup>1</sup> A recent meta-analysis<sup>8</sup> showed that youth who experienced peer victimization were twice as likely to be depressed up to 36 years later. Peer victimization also increases the risk of adverse social outcomes, including living in poverty, never completing college, and having fewer friends.<sup>3</sup>

Children born at very low (<1500 g) or extremely low birth weight (ELBW; <1000 g) appear to be at particularly high risk for experiencing peer victimization.<sup>10-13</sup> This finding may be a result of these children possessing elevated levels of characteristics that put them at risk for peer victimization, including poor motor abilities,<sup>14,15</sup> more anxiety and depression,<sup>16,17</sup> and lower IQ.<sup>15,18</sup> They may also have fewer resilience factors that buffer the effects of peer victimization, including better academic performance<sup>19</sup> and social skills.<sup>20</sup>

The exposure of ELBW survivors to significant prenatal and postnatal adversity likely contributes to their increased vulnerability to the adverse psychiatric effects of peer victimization.<sup>21-25</sup> While recent evidence suggests that children born very preterm and who experience peer victimization may have elevated rates of emotional problems in childhood, it is not clear if these persist into adulthood.<sup>26</sup> In addition, it is not known if these problems

are clinically significant as they have been typically measured by using screening questionnaires.<sup>26</sup>

This study utilizes the oldest, longitudinally-followed ELBW cohort in the world, a sample of ELBW survivors from central-west Ontario, and a matched normal birth weight (NBW; >2500 g) sample to examine associations between exposure to peer victimization in childhood and adolescence and psychiatric outcomes at 2 time points in adulthood (ie, their 20s and 30s).

## METHODS

### Sample

Study participants included all of the ELBW survivors born in 1977-1982 in central-west Ontario,<sup>27</sup> and a control group of NBW children recruited at age 8 years and matched on age, gender, and familial socioeconomic status (SES).<sup>15</sup> Of the original 397 ELBW survivors who were recruited, 218 died previous to discharge from the hospital, resulting in a sample of 179 ELBW survivors. For this study, we focused on data collected at age 8, 22 to 26, and 29 to 36 years. At age 8 years, all data were provided by parents, while at age 22 to 26 and 29 to 36 years, data were reported by participants. Written informed consent was obtained from parents (age 8 years) and participants (age 22-26 and 29-36 years). Approval for the use of human participants for this study was obtained through the McMaster University's and Hamilton Health Sciences' research ethics committees.

### Predictor: Peer Victimization

Participants retrospectively reported on their experiences of peer victimization prior to 16 years at age 22 to 26 years by using 2 items from the Childhood Experiences of Violence Questionnaire.<sup>28</sup> On a 5-point scale (1 = never, 5 = >10 times), participants reported on their experiences with verbal

(“Sometimes kids get hassled or picked on by other kids who say hurtful or mean things to them. How many times did this happen to you before age 16?”) and physical peer victimization (“Sometimes kids get pushed around, hit or beaten up by other kids or a group of kids. How many times did this happen to you before age 16?”). Verbal and physical peer victimization scores were correlated ( $r = 0.41$ ,  $P < .001$ ) and were summed to create a 10-point measure, as increasing exposure to peer victimization has been found to have a strong and graded association with psychiatric problems.<sup>29</sup>

### Outcome: Psychiatric Disorders

Psychiatric disorders were assessed at age 22 to 26 and age 29 to 36 years. At 22 to 26 years, participants (ELBW  $n = 142$ , NBW  $n = 133$ ) completed the Young Adult Self-Report (YASR) questionnaire.<sup>30</sup> The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* oriented scales of the YASR<sup>31</sup> were used to assess depressive problems ( $\alpha = .88$ ), anxiety problems ( $\alpha = .77$ ), avoidant personality problems ( $\alpha = .76$ ), antisocial personality problems ( $\alpha = .80$ ), and attention-deficit/hyperactivity disorder (ADHD) problems ( $\alpha = .72$ ). The scales were dichotomized at the 90th percentile to identify participants who were at elevated risk for clinically significant psychiatric problems.<sup>21,31</sup>

At the 29 to 36 year old follow-up (ELBW  $n = 84$ , NBW  $n = 90$ ), the presence of psychiatric disorders was assessed by using the Mini International Neuropsychiatric Interview (MINI),<sup>32</sup> a structured psychiatric interview conducted by trained interviewers. This interview was complemented by additional modules from the MINI-Plus<sup>33</sup> which added lifetime disorders. Van Lieshout et al<sup>25</sup> previously reported the procedures for this sample. For both the YASR and MINI outcomes, a minimum

**TABLE 1** Demographic Characteristics of Participants and Nonparticipants at Age 29 to 36 Years

Characteristic	Participants		Nonparticipants	
	ELBW	NBW	ELBW	NBW
No. participated at age 29–36 y	84	90	95	55
Gender, male (%)	31 (37)	36 (40)	53 (56)	30 (54)
Birth wt, mean (SD) grams	828.9 (132.3)	3410.6 (473.4)	844.8 (114.2)	3310.9 (510.9)
Gestational age, mean (SD) wk	27.1 (2.3)	Term	27.0 (2.2)	Term
Familial SES, mean (SD)	3.1 (0.9)	3.0 (1.0)	3.5 (0.9)	3.3 (1.0)
Family functioning, mean (SD)	20.5 (5.0)	19.5 (5.1)	19.7 (4.4)	20.5 (4.7)
Total problems, clinical level	32	26	33	20
Peer victimization, mean (SD)	5.1 (2.0)	4.4 (2.0)	5.1 (2.0)	5.1 (2.2)

The scale for SES was 1 = highest SES, 5 = lowest SES.

prevalence threshold of 5 cases total (ELBW plus NBW) was required for a disorder to be included. This resulted in the inclusion of current major depressive disorder, panic disorder, agoraphobia, social phobia, obsessive-compulsive disorder, generalized anxiety disorder, and the inattentive subtype of ADHD. Lifetime disorders eligible for analysis included bipolar disorder, major depressive disorder, posttraumatic stress disorder, and panic disorder. We also examined the current and lifetime prevalence of “any alcohol or substance use disorder,” which collapsed the diagnoses of alcohol and substance abuse and dependence. Finally, we created a composite variable that examined the presence of any current or any lifetime diagnosis of a non-alcohol and non-substance use disorder. These 2 variables were comprised of the disorders listed above except for alcohol and substance use problems.

### Birth Variables

The gender, birth weight, and gestational age were recorded at birth and collected from medical charts for ELBW participants and collected at age 8 years via maternal report for NBW participants.

### Childhood Variables

As child and familial characteristics can account for increases in rates of psychiatric disorders,<sup>1–3</sup> and emotional and behavioral problems in childhood have been found to predict higher levels of peer

victimization,<sup>7</sup> we adjusted for SES, family function, and childhood emotional and behavioral problems, which were measured at age 8 years.

Familial SES was measured using the Hollingshead<sup>34</sup> 2-factor index of social position (1 = highest SES, 5 = lowest SES), which included education and occupational prestige.

Parents completed the McMaster Family Assessment Device General Functioning subscale,<sup>35,36</sup> which measured the functioning of the family. Its 12 questions were summed to measure concepts such as whether family members turn to each other in a crisis ( $\alpha = 0.91$ ).

Parents also completed the Child Behavior Checklist.<sup>37</sup> We used the total problems scale, which measures maladaptive behavior. This scale was computed ( $\alpha = .93$ ), and cut-off scores for having behavior problems were computed according to the provided guidelines<sup>37</sup> to have a measure of clinically significant levels of maladaptive behavior. Those with clinically significant levels were assigned a value of 1, and those who did not were assigned a value of 0.

### Participant Attrition

As this sample has been followed into adulthood, attrition could affect the validity of the analyses. Therefore, differences between participants and nonparticipants at age 29 to 36 years were investigated separately within ELBW and NBW samples (Table 1). We examined the following variables for their ability to predict

nonresponse: gender, gestational age, birth weight, familial SES, childhood emotional and behavioral problems, family functioning, and psychiatric disorders at age 22 to 26 years.

Within the ELBW sample, those who participated in both the visit at birth and the visit at age 29 to 36 years were more likely to be female ( $\chi^2[2, N = 179] = 6.38, P = .01$ ), and those who participated in both the visit at age 8 years and the visit at age 29 to 36 years were more likely to have a higher SES (mean difference 0.36 [95% confidence interval (CI), 0.07–0.65]). There were no other significant differences.

For the NBW sample, those who participated in both the visit at age 8 years and the visit at age 29 to 36 years were more likely to have a higher SES with a mean difference of 0.37 (95% CI, 0.03–0.72). Those who participated in both the visit at age 22 to 26 years and the visit at 29 to 36 years reported lower levels of peer victimization, but the difference was not statistically significant ( $P = .093$ ). There were no other significant differences.

Given these results, in addition to controlling for familial SES, family functioning, and childhood emotional and behavioral problems, we also controlled for the gender of the participants,<sup>1–3</sup> to exclude the possible impact of our predictors of attrition.

### Data Analysis

Analyses were conducted using IBM SPSS Statistics 22 (IBM Corporation, Armonk, NY). Missing data for all covariates were imputed by using the fully conditional specification. Among participants included in the analyses, 96% ( $n = 167$ ) had no missing information, 2% ( $n = 3$ ) had missing information on 1 variable, and 2% ( $n = 4$ ) had missing information on 2 variables. Data on our covariates were imputed to increase our statistical power and to ensure that

**TABLE 2** Associations Between Experiencing Peer Victimization and Adult Mental Health Outcomes

Outcome	No. of Cases		ELBW		NBW	
	ELBW	NBW	Unadjusted	Adjusted	Unadjusted	Adjusted
			OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
YASR Problems at the Age 22–26 y Visit						
Depression	13	10	1.65 (1.26–2.16)	1.67 (1.23–2.28)	1.33 (0.98–1.80)	1.30 (1.10–1.53)
Anxiety	14	8	1.43 (1.12–1.83)	1.36 (1.05–1.76)	1.34 (0.96–1.87)	1.29 (1.08–1.54)
Avoidant personality	17	13	1.38 (1.09–1.74)	1.39 (1.08–1.79)	1.21 (0.92–1.58)	1.12 (0.96–1.29)
Antisocial personality	7	15	1.78 (1.27–2.48)	1.92 (1.29–2.87)	1.37 (1.06–1.78)	1.32 (1.14–1.28)
ADHD	22	17	1.50 (1.17–1.93)	1.39 (1.06–1.83)	1.14 (0.89–1.45)	1.09 (0.83–1.43)
Current MINI Diagnoses at the Age 29–36 y Visit						
Major depressive disorder	6	2	1.35 (0.88–2.06)	1.42 (0.86–2.34)	2.34 (1.0–5.11)	<sup>a</sup>
Panic disorder	6	1	1.75 (1.09–2.81)	1.69 (1.01–2.83)	1.42 (0.59–3.41)	<sup>a</sup>
Agoraphobia	11	6	1.44 (1.02–2.02)	1.36 (0.95–1.96)	1.16 (0.78–1.73)	1.06 (0.83–1.34)
Social phobia	8	4	1.57 (1.05–2.36)	1.53 (0.99–2.36)	1.23 (0.76–1.97)	1.19 (0.75–1.88)
Obsessive-compulsive disorder	4	3	2.88 (1.33–6.22)	3.56 (1.25–10.09)	1.15 (0.67–2.00)	1.45 (0.77–2.72)
Generalized anxiety disorder	9	8	0.97 (0.68–1.39)	0.94 (0.66–1.36)	1.28 (0.91–1.82)	1.38 (1.14–1.68)
ADHD (inattentive subtype)	8	2	1.21 (0.83–1.75)	1.29 (0.79–2.11)	1.44 (0.76–2.71)	1.46 (0.98–2.17)
Any alcohol or substance use disorder	10	23	0.88 (0.62–1.26)	0.88 (0.60–1.31)	1.10 (0.87–1.40)	1.13 (0.99–1.29)
Any non-alcohol and non-substance use psychiatric disorder	27	14	1.26 (0.98–1.60)	1.30 (0.97–1.72)	1.35 (1.00–1.80)	1.30 (1.11–1.52)

Adjusted analyses included the covariates of participant gender, familial SES, family functioning, and childhood emotional and behavioral problems.

<sup>a</sup> Not enough power for analyses.

the sample was representative of all participants.<sup>38</sup> Ten imputation data sets were created, and the results for each outcome used the results of the pooled data.

We used logistic regression to examine unadjusted associations between peer victimization subscale scores on the Childhood Experiences of Violence Questionnaire and each of the YASR and MINI psychiatric outcomes separately for the ELBW and NBW samples. This decision was made as a result of a priori hypotheses that the associations would differ between the 2 groups as ELBW survivors are exposed to significant perinatal adversity. In addition, ELBW survivors may be more susceptible to the negative outcomes of peer victimization as they have been found to have higher levels of physical, cognitive, and emotional problems in comparison with the NBW sample.<sup>14–18</sup>

Next, we controlled for known confounding variables (ie, participant gender, familial SES, family functioning, and childhood emotional and behavioral problems).

## RESULTS

Demographic characteristics of the ELBW and NBW samples can be found in Table 1. The 2 samples did not differ by gender, familial SES, family functioning, or levels of childhood emotional and behavioral problems. Age at the 29 to 36 year visit also did not differ between the ELBW (mean = 32.03, SD = 1.61) and NBW (mean = 32.45, SD = 1.34) samples. The ELBW sample reported higher levels of peer victimization (mean difference = 0.66, 95% CI, 0.08–1.25).

### ELBW Sample

At the age 22 to 26 year follow-up (Table 2), for each 1-point increase in the 10-point peer victimization subscale, ELBW survivors had significantly higher odds of clinical levels of all 5 psychiatric problems in both our adjusted and unadjusted analyses. Specifically, risks for depression (odds ratio [OR] = 1.67, 95% CI, 1.23–2.28), anxiety (OR = 1.36, 95% CI, 1.05–1.76), avoidant personality (OR = 1.39, 95% CI, 1.08–1.79), antisocial personality (OR = 1.92, 95% CI, 1.29–2.87), and ADHD problems (OR = 1.39, 95% CI,

1.06–1.83) were elevated in adjusted analyses.

At the age 29 to 36 year follow-up (Table 2), for each 1-point increase in the peer victimization subscale, ELBW survivors had increased odds of a current diagnosis of obsessive-compulsive disorder (OR = 2.88, 95% CI, 1.33–6.22), social phobia (OR = 1.57, 95% CI, 1.05–2.36), panic disorder (OR = 1.75, 95% CI, 1.09–2.81), and agoraphobia (OR = 1.44, 95% CI, 1.02–2.02), prior to adjustment for covariates. Odds of panic disorder (OR = 1.69, 95% CI, 1.01–2.83) and current obsessive-compulsive disorder (OR = 3.56, 95% CI, 1.25–10.09) remained significant in adjusted analyses. For lifetime diagnoses (Table 3), ELBW survivors had increased odds of bipolar and any non-alcohol and non-substance use disorder in adjusted models only.

### NBW Sample

At the age 22 to 26 year visit (Table 2), NBW peer victimization scores were positively correlated with clinically significant levels of antisocial problems in both unadjusted and adjusted models. They also had increased risk of

**TABLE 3** Associations Between Experiencing Peer Victimization and Lifetime Mental Health Outcomes at Age 29 to 36 Years

Outcome	ELBW				NBW	
	No. of Cases		Unadjusted	Adjusted	Unadjusted	Adjusted
	ELBW	NBW	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Bipolar disorder	5	7	1.61 (0.98–2.62)	1.97 (1.03–3.74)	1.16 (0.80–1.69)	1.12 (0.92–1.38)
Major depressive disorder	21	23	1.18 (0.90–1.55)	1.27 (0.94–1.71)	1.19 (0.94–1.52)	1.24 (1.09–1.42)
Posttraumatic stress disorder	6	3	1.29 (0.84–1.96)	1.26 (0.82–1.94)	1.15 (0.67–2.00)	1.37 (0.71–2.66)
Panic disorder	8	10	1.16 (0.81–1.69)	1.11 (0.74–1.65)	1.20 (0.87–1.66)	1.18 (0.99–1.40)
Any alcohol or substance use disorder	21	45	1.16 (0.90–1.50)	1.19 (0.90–1.58)	1.13 (0.91–1.41)	1.14 (0.90–1.46)
Any non-alcohol and non-substance use psychiatric disorder	30	32	1.22 (0.96–1.55)	1.34 (1.02–1.76)	1.24 (0.99–1.56)	1.25 (1.11–1.41)

Adjusted analyses included the covariates of participant gender, familial SES, family functioning, and childhood emotional and behavioral problems.

depression and anxiety problems, but this was in adjusted models only.

At the age 29 to 36 year time point (Table 2), NBW participants who experienced more peer victimization had an increased risk of current major depressive disorder in unadjusted models. In adjusted models only, peer victimization was associated with an increased risk of current generalized anxiety disorder and any non-alcohol/non-substance use disorder, and an increased risk of lifetime major depressive disorder and any non-alcohol/non-substance use disorder (Table 3).

## DISCUSSION

After controlling for known confounding variables, exposure to peer victimization in childhood and adolescence was linearly associated with increased levels of clinically significant psychiatric problems in adulthood in ELBW survivors, and more modestly in NBW participants. Specifically, peer victimization was associated with increased odds of anxiety, depression, avoidant personality, antisocial personality problems, and ADHD in ELBW participants' 20s, and anxiety disorders, in particular, in their 30s.

Our findings that ELBW survivors subjected to peer victimization had an increased risk of panic disorder and obsessive-compulsive disorder are similar to those reported in typically developing NBW children.<sup>1,8</sup> Although we did observe

expected associations between peer victimization and psychiatric problems in our NBW sample, they typically were not statistically significant. However, our lack of statistically significant findings may have been because of inadequate statistical power that may have contributed to a reduction in the number of statistically significant results observed in both groups. Indeed, when we examined YASR scores as continuous variables at the age 22 to 26 year visit (see Supplemental Table 4), peer victimization was associated with statistically significant elevations in depression, anxiety, and avoidant personality problem scores for NBW participants ( $P_s < 0.02$ ), even after adjusting for covariates.

There may have been more significant associations between peer victimization and mental health outcomes in adulthood in the ELBW sample than the NBW sample because of the cumulative risks<sup>39</sup> experienced by ELBW survivors who are victimized. The stressful events during fetal and early postnatal development that result in preterm birth may influence brain development<sup>40</sup> and later stress responsiveness, possibly through changes in the hypothalamic-pituitary-adrenal (HPA) axis.<sup>41</sup> Indeed, prenatal adversity may predispose individuals to becoming victims.<sup>42</sup> As peer victimization can lead to HPA dysregulation,<sup>43,44</sup> this may place children and

adolescents born at ELBW at a greater disadvantage when they need to manage psychosocial stressors during development.<sup>45</sup> The accumulation of risks<sup>39</sup> that can lead to further HPA axis dysregulation, including being born ELBW and the experience of peer victimization, may cumulatively contribute to poorer psychiatric outcomes in adulthood for ELBW survivors.

To attempt to offset the attrition that has affected our sample size over the last 30 years, we examined associations between peer victimization and mental disorders at both age 22 to 26 years (when we had a larger sample) and at age 29 to 36 years. We also adjusted for predictors of attrition and used multiple imputation to attempt to minimize the impact of any attrition effects. Our pattern of results across 2 different psychiatric measures and over nearly 15 years provides us with confidence that peer victimization does predict higher levels of psychiatric disorders in adulthood, and that it is possible that this impact is stronger in ELBW survivors. However, more research is required with larger samples to replicate our findings and to statistically examine moderation by birth weight status to investigate if children born at ELBW, in comparison with those born at NBW, have a significantly higher risk of psychiatric disorders in adulthood as a result of experiencing peer victimization.

In regards to measurement, our rates of major depressive disorder and substance and alcohol use and dependence, as measured with the MINI,<sup>25</sup> may be somewhat higher than national rates. This could be a result of the MINI not including “rule out” criteria that are present in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; specifically, that participants’ symptoms are better explained by another disorder or condition. We also used a measure that retrospectively reported on experiences of peer victimization in childhood and adolescence, which does lead to the possibility of recall bias. However, victims’ reports of peer victimization have been found to be stable over time,<sup>46</sup> and retrospective reporting of peer victimization has been found to be related with victim/non-victim status up to 7 years later.<sup>47</sup> As peer victimization experienced prior to age 16 years was reported at age 22 to 26 years, it is possible that childhood emotional and behavioral problems reported at age 8 years were reported concurrently or prior to peer victimization. Future research should examine the relative impact of peer victimization during different periods of development, as outcomes have been found to be worse if youths are victimized in secondary/high school versus elementary/middle school.<sup>48</sup> Furthermore, our

measure of peer victimization does not strictly follow the definition put forth by the Centers for Disease Control and Prevention and the US Department of Education<sup>49</sup> in that we did not specify that the victimization was repeated, intentional, and that a power imbalance was present. In addition, it did not exclude victimization by children other than peers, including siblings or romantic partners, nor attacks that happened in a fight.

In addition, the sample participants were born in the late 1970s to early 1980s, and so improvements in neonatal care may affect findings seen in later born cohorts. Finally, the sample participants were primarily Caucasian and came from a country with universal health care, so these results may be more generalizable to those born in countries with similar demographics and social systems. However, this study does provide us with the first opportunity to assess the impact of peer victimization on clinically significant psychiatric problems in ELBW survivors into the fourth decade of life.

## CONCLUSIONS

This study is the first to show that ELBW children, who are already at greater risk for being exposed to peer victimization, may also be negatively impacted by exposure to peer victimization. These results have

important implications for parents, caregivers, and clinicians and for understanding the long-term effects of peer victimization on mental health. Indeed, parents, teachers, educators, and physicians should be aware of these risks and intervene when possible.

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## ABBREVIATIONS

ADHD: attention-deficit/hyperactivity disorder  
CI: confidence interval  
ELBW: extremely low birth weight  
HPA: hypothalamic-pituitary-adrenal  
MINI: Mini International Neuropsychiatric Interview  
NBW: normal birth weight  
OR: odds ratio  
SES: socioeconomic status  
YASR: Young Adult Self-Report

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