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# Understanding the Relationship Between Adverse Childhood Experiences, Peer-Violence Perpetration, and Gender Norms Among Very Young Adolescents in Indonesia: A Cross-Sectional Study



Astha Ramaiya, Dr.P.H.<sup>a,\*</sup>, Ifta Choiriyah, Ph.D.<sup>b</sup>, Lori Heise, Ph.D.<sup>a,c</sup>, Julie Pulerwitz, Sc.D, Sc.M.<sup>d</sup>, Robert Wm Blum, M.D., M.P.H., Ph.D.<sup>a</sup>, Ruti Levtoy, Ph.D.<sup>c</sup>, Rebecka Lundgren, Ph.D.<sup>e</sup>, Lisa Richardson, Ph.D.<sup>f</sup>, and Caroline Moreau, M.D., M.P.H., Ph.D.<sup>a,g</sup>

<sup>a</sup> Department of Population, Family and Reproductive Health, Johns Hopkins University, Baltimore, Maryland

<sup>b</sup> Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

<sup>c</sup> The Prevention Collaborative, Washington, District of Columbia

<sup>d</sup> Population Council, Washington, District of Columbia

<sup>e</sup> Center on Gender Health and Equity, University of California San Diego, San Diego, California

<sup>f</sup> Institute of Women and Ethnic Studies, UNO Research and Technology Foundation, Inc., New Orleans, Louisiana

<sup>g</sup> Soins Primaires et Prévention, Inserm U1018, Center for Research in Epidemiology and Population Health (CESP), Villejuif, France

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## ABSTRACT

**Purpose:** This study assesses the role of gender norms on the relationship between adverse childhood experiences (ACEs) and peer-violence perpetration among very young adolescents in three urban poor cities of Indonesia.

**Methods:** A cross-sectional study was conducted in Bandar Lampung, Denpasar, and Semarang in Indonesia. A total of 2,974 participants (boys: 44.79%, girls: 55.21%) between 10 and 14 years were included in the analysis. Logistic regression, mediation, and moderation analyses were conducted stratified by sex.

**Results:** Risk factors of peer-violence perpetration among boys and girls included three (boys: adjusted odds ratio [aOR] 2.51, 95% confidence interval [CI] 1.32–4.75; girls: aOR 1.82, 95% CI .95–3.52) and four or more (boys: aOR 6.75, 95% CI 3.86–11.80; girls: aOR 5.37, 95% CI 3.07–9.37) history of ACE. Risk factors of peer-violence perpetration among boys included having inequitable sexual double standard (SDS) indices (aOR 1.46, 95% CI 1.09–1.95). SDS measures the perception boys are rewarded for romantic relationship engagement, whereas girls are stigmatized or disadvantaged for the experience. Other risk factors included lifetime tobacco use among boys and girls and lifetime alcohol use among boys. Protective factors included parental closeness among girls.

**Conclusions:** Based on the research in three Indonesian communities, this study demonstrates that boys are disproportionately exposed to adversities including history of ACE, inequitable SDS, lifetime alcohol use and tobacco use in comparison to girls. Programs targeting ACE and gender norms which engage boys, girls, and families are more likely to be successful in reducing peer-

## IMPLICATIONS AND CONTRIBUTION

This study provides increased evidence for the relationship between peer-violence perpetration and adverse childhood experiences among young adolescents in Indonesia. Although unequal gender norms increase peer-violence perpetration among boys, they do not mediate/moderate the relationship between adversity and male aggression. Interventions reducing male aggression should be

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\* Address correspondence to: Astha Ramaiya, Dr.P.H., Department of Population, Family and Reproductive Health, Johns Hopkins University, 615 N. Wolfe Street, Baltimore, MD 21205.

E-mail address: aramaiy1@jhu.edu (A. Ramaiya).

violence perpetration and promoting gender equitable norms.

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supplemented with  
trauma-informed care.

The Sustainable Development Goal 16 commits the world community to eliminate all forms of violence by 2030, including suicide and self-harm, interpersonal violence, and collective violence [1]. However, rates of homicide, lethal violence, and intimate partner/family-related homicide have stayed the same or increased between 2007 and 2017 [2]. Interpersonal violence represents the second cause of disability-adjusted life years among 15–19 males globally [3]. It is defined as follows: deprivation or neglect, emotional, physical or sexual abuse, and includes both family/partner and community violence [4]. A global meta-analysis of common adverse events in childhood indicated that 14%–55% of children experience physical abuse, 12%–22% experience physical neglect, 13%–25% experience emotional neglect, and 11%–22% of girls and 4%–19% of boys are victims of sexual abuse before they reach 18 years of age [5]. Peer-violence in the form of physical fighting or bullying is also common among young adolescents: in more than half of the 144 countries surveyed as part of the Global School-based Student Health Survey, a majority of boys engaged in at least one physical fight in the last 12 months and 10%–65% of young adolescents had been bullied in the last 2 months [6].

The consequences of these harmful exposures can be dire, especially during children's formative years, as adverse childhood experiences (ACEs) are shown to have immediate and long-term sequelae including heightened risk of chronic mental illness, substance abuse, impaired physical health, cardiovascular disease, and cancer [6,7]. These risks intensify as the number of ACE increases, which also raises concern over the perpetuation into the future because ACE could be associated with peer-violence perpetration [7]. An extensive body of research has documented this association in high income settings [8,9], but less in known in low and middle income country (LMIC) settings where these harmful exposures are more prevalent [10,11]. One study, designed to develop a measure of ACE for young adolescents across LMICs reported 33% and 46% higher odds of peer-violence perpetration among boys and girls exposed to ACE; the small sample size of adolescents in the 14 sites surveyed prevented a more thorough investigation of the effect of ACE on violence perpetration or the factors that may mitigate this risk [12]. To our knowledge, this is one of the first population-based study looking at the relationship between ACE and peer-violence perpetration among early adolescents living in an LMIC setting.

To further our understanding of the mechanisms linking exposure to ACE to peer-violence perpetration, we draw on psychological explanations derived from social learning theory [13] and generalized strain theory [14], the former emphasizing the role of observational learning to inform peer-violence perpetration [13,15] and the later directing attention to altered emotional-regulation skills in response to adversity-related stress [16,17]. Beyond developmental experiences, we recognize the social-ecological etiology of violence that is not only driven by individual factors but embedded in sociocultural influences that span from the immediate environment to broader societal forces [18]. Specifically, Heise's adaptation of the

socioecological model recognizes economic deprivation as an immediate contextual factor exacerbating aggressive behavior but also draws attention to gender norms that promote aggression as a manifestation of masculinity [18]. Such norms, valuing male toughness and authority, are internalized and influence individual behaviors [19]. Such a mechanism is well documented in relation to gender-based violence in adult populations [20] but has not been thoroughly investigated in relation to other forms of violence, including peer-violence perpetration especially among very young adolescents (VYAs) stratified by sex. We examine these associations among boys and girls separately as some studies conducted in high income settings suggest stronger associations between ACE and violent behaviors among girls [21]. Additionally, previous studies in high income settings have demonstrated that boys have a significantly higher proportion of perpetrating violence, whereas girls have a higher prevalence of being victims of violence [8,9].

The present paper aims to explore those relationships and specifically to:

1. Understand the relationship between ACE and peer-violence perpetration among VYAs in Indonesia;
2. Understand if and how perceptions of unequal gender norms mediate and/or moderate the relationship between ACE and peer-violence perpetration in early adolescence based on Heise's adaptation of the socioecological model on violence [18].

Our objectives are informed by our proposed conceptual framework (Figure 1) relating experiences of ACE to peer-violence perpetration. We assess if this relationship is mediated or moderated by inequitable gender norm perceptions (as measured by the sexual double standard [SDS] and gender stereotypical trait [GST] scales) (Appendix 1), while accounting for sociodemographic factors, family relations, and substance use found to be related to bullying and violence in previous studies [8,11,22,23].

## Methods

### Study setting

The present study uses data from the Global Early Adolescent Study (GEAS) conducted in three communities in Indonesia (Semarang, Denpasar, and Bandar Lampung) where data suggest that prevalence of violence perpetration ranges from 3.4% to 85% [22,24–26]. The three cities were selected to represent a diversity of sociocultural and economic contexts. Denpasar, located on the island of Bali, is the most developed of the three settings. A majority of its 793,000 inhabitants are Balinese (65%) [27], practice Hinduism, and work in the service industry. Bandar Lampung is the capital of Lampung Province and has a multi-ethnic population of 885,363 people, including 41% Javanese [27]. Most of the population is Muslim, and its economy is split between farming, manufacturing, and retail-wholesales activities. Semarang, located in the province of Central Java is home to

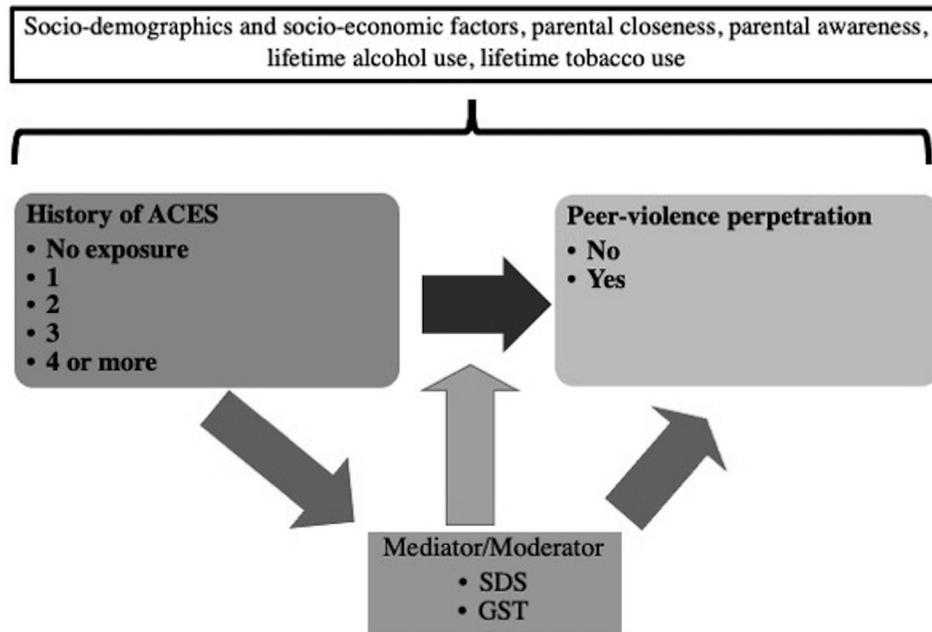


Figure 1. Conceptual framework.

930,727 habitants, mostly Javanese [27]. A majority of the population is Muslim, and its economy relies on manufacturing and retail-wholesales. In terms of gender development, Denpasar is characterized by the highest Gender Development Index at .960, followed by Semarang at .957, while Bandar Lampung falls behind at .937.

#### Data source

The present analysis draws on baseline data collected in all three sites in 2019. All sites shared the same study protocol and survey instruments. The study received ethical approval from the Universitas Gadjah Mada in Indonesia and approval for secondary data analysis from the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

#### Participants and study size

Rutgers Indonesia and the regional International Planned Parenthood Foundation chapter identified eligible adolescents through school-based sampling, by purposively selecting 18 schools to serve as intervention and comparison schools. The intervention (Semangat Dunia Remaja or Teen Aspirations, SETARA) is a comprehensive sexuality education curriculum for middle school students designed by Rutgers Indonesia. Schools were selected based on the following criteria: nonreligion and public, serving low income populations, absence of concomitant health programs, and prior partnerships with the regional International Planned Parenthood Foundation chapter. GEAS youth enumerators invited the parents of all seventh graders to school to receive information about SETARA and the three waves of GEAS to evaluate students' health status as well as the effect of SETARA, and to seek their consent for their children's participation in SETARA and GEAS. All students from seventh grade classes in the selected schools were eligible to participate. Invitations

were extended to 5,283 students of whom 241 refused participation, and 5,042 completed the interview. However, 256 interviews were excluded due to poor quality (>15% of missing information) and 467 were excluded due to missing information on peer-violence perpetration question or ACE (>25% missing = 627), gender norm perception measures (n = 434), or other confounders (n = 284) resulting to a final analytical sample of 2,974 (44.79% boys and 55.21% girls). Participants who were excluded were more likely to be boys, from Bandar Lampung, from less wealthy households, and subject to less parental monitoring.

#### Data collection

The baseline survey was conducted between August and October 2018. Adolescents self-completed a structured questionnaire via computer-assisted personal interview, which solicited information on sociodemographic characteristics, family and peer relations, school and neighborhood characteristics, media use, perceptions of gender norms, agency, physical, mental and sexual health, as well as violence experiences in the form of ACE and peer-violence perpetration. The survey instrument [28] was pretested before survey implementation.

#### Variables

The dependent variable was peer-violence perpetration based on two questions: (1) During the last 6 months, have you bullied or threatened another boy or girl for any reason? and (2) During the last 6 months, have you slapped, hit or otherwise physically hurt another boy or girl in a way that they did not want? A binary variable was created combining responses to the two questions into a single measure. More than four-out-of-five respondents indicated that they had neither bullied nor perpetrated peer-violence in the previous six months.

The main independent variable, ACE, was based on a 13-item measure adapted from the original Center for Disease Control-Kaiser ACEs Study with modifications from the APHRC measure that had been previously administered in the slums of Nairobi [29]. The measure was previously validated with early adolescents in 14 sites across the globe [12]. The measure includes items about fear of physical abuse, fear of emotional abuse, physical neglect, emotional neglect, sexual abuse, violence victimization, parental substance abuse, parental emotional distress, domestic violence, parental incarceration, and household instability (Appendix 2) [12,29]. The 13 items were combined into a cumulative score (Appendix 1) and further categorized into 5 groups: no ACEs: 18.29%, 1 ACE: 16.58%, 2 ACEs: 16.44%, 3 ACEs: 15.80%, 4+ ACEs: 32.89%. We chose this categorization based on prior studies indicating multiple forms of ACE (4 or more) were significantly more harmful than fewer exposures [8], and because of the distribution of cumulative experiences in our sample.

We considered two measures of gender norm perceptions that were developed as cross cultural measures specific for this age group [30]. The SDS scale (a 6-item scale) [30] captures perceptions of unequal expectations related to romantic relations, valuing boys and sanctioning girls. The GST scale (a 7-item scale) measures young people's perceptions of differential traits, portraying boys as tough and girls as weak (Appendix 1). The internal reliability of each scale ranged from .77 to .81 for SDS and .65 to .73 for GST across the three Indonesia sites. The continuous measures were subsequently dichotomized into more equitable and less equitable gender norms (based on the median for each sex), due to the skewedness of the distributions, ease of interpretation of the results, and approach previously reported with another GEAS study [31].

Intervening variables based on the socioecological model and the literature included site (Bandar Lampung, Denpasar, and Semarang), age (10–12 years, 13–14 years), educational attainment (lower than age expected grade and age expected grade or higher), lifetime alcohol use (yes or no), and lifetime tobacco use (yes or no). We also considered family factors including household composition (no parent, single parent, and both parent household), household wealth tertiles, parental closeness (assessed by the question: “do you feel close to your main caregiver? By close, we mean you talk to that person and tell them about personal and important things” and dichotomized yes or no), parental awareness/monitoring (assessed by caregiver's knowledge of: adolescents' friends, school performance, and general whereabouts and dichotomized yes or no), and site (Bandar Lampung, Denpasar, and Semarang).

### Analysis

We conducted bivariate analysis to specify the associations between peer-violence perpetration, ACE and gender norm perceptions, and the associations between gender norm perceptions and ACE. Given the absence of site-specific differences in associations between ACE and peer-violence perpetration, we combined data from all three sites for analysis. Analyses were stratified by sex to account for potential differences in the determinants of aggressive behaviors between boys and girls. The multivariable logistic analysis first assessed the relationship between ACE and peer-violence perpetration by sex. We then conducted a mediation analysis, using the STATA “medeff” command and “bootstrap” option with 1,000 replications, to

evaluate the extent to which gender norms perceptions (SDS and GST) mediated the relationship between ACE and peer-violence perpetration. Mediation was only assessed if the following three conditions were met: (1) ACE was significantly related to peer-violence perpetration, (2) ACE was significantly related to gender norm perceptions, and (3) gender norm perceptions were significantly related to peer-violence perpetration. Mediation analysis was only conducted for the relationship between ACE, SDS, and peer-violence perpetration among boys and was not statistically significant (mediation: 4.62%, 95% confidence interval [CI] –80.15% to 87.91%). Additionally, we assessed whether gender norm perceptions moderated the association between ACE and peer-violence perpetration, by testing for interactions in the adjusted logistic regression models. All analyses were conducted using Stata 14.2 [32].

## Results

### Characteristics of the sample

Table 1 shows the sociodemographic characteristics of the sample. Overall, there was an equal distribution of boys and girls across the three cities. The mean age of the study sample was 12.1 years and 98.66% were at the appropriate grade-for-age. Boys were slightly older than girls (12.2 vs. 12.1 years,  $p < .001$ ), less likely to be in the appropriate grade level (97.81% vs. 99.41%,  $p \leq .001$ ), and live with neither parents (5.03% vs. 3.05%,  $p = .016$ ). A majority felt close to their caregiver (89.17%), with no significant difference by sex. Girls were more likely to be closely monitored by their parents (70.83% vs. 59.98%,  $p \leq .001$ ). Few adolescents reported using any substance, although these behaviors were more common among boys than girls: 6.08% of boys versus .97% of girls ever drank alcohol ( $p \leq .001$ ) and 16.59% of boys versus 1.10% girls reported ever smoking ( $p \leq .001$ ).

Less than one in five adolescents reported no history of ACE while almost a third were exposed to four or more ACE (Table 1). Boys were more likely to report any ACE exposure (84.01% vs. 79.84% for girls) and to be poly-victimized of four or more ACEs (38.74% reported four or more ACEs vs. 28.14% of girls). Overall, 17.52% of the participants stated they had perpetrated peer-violence in the last 6 months, with boys more likely to engage in this behavior than girls (24.17% vs. 12.12%;  $p \leq .001$ ).

### Bivariate associations between gender norm perceptions and adverse childhood experience

Adolescents who reported no exposure to ACE were more likely to hold gender equal norms than peers who sustained childhood adversities (Table 2). Thus, depending on the number of ACEs reported by boys, the proportion of boys scoring above the median (corresponding to more unequal norms) ranged from 47.42% to 61.82% on the SDS scale, and from 48.36% to 66.28% on the GST scale as the number of ACEs increased. Likewise, the proportion of girls scoring above the median (corresponding to more unequal views) ranged from 45.32% to 58.44% on the SDS scale, as the number of ACEs increased.

### Bivariate associations between adverse childhood experience, gender norm perceptions, and peer-violence

The proportion of peer-violence in the last 6 months increased significantly with the number of ACEs among boys,

**Table 1**

Distribution of sociodemographic characteristics, confounders, peer-violence perpetration, and gender norms by sex among GEAS participants in Indonesia

Variables	Overall (N = 2,974), n (%)	Boy (N = 1,332), n (%)	Girl (N = 1,642), n (%)	p-value
City				.573
Bandar Lampung	628 (21.12)	282 (21.17)	346 (21.07)	
Denpasar	1,299 (43.68)	594 (44.59)	705 (42.94)	
Semarang	1,047 (35.21)	456 (34.23)	591 (35.99)	
Age				≤.001
10–12 years	2,345 (78.85)	1,003 (75.30)	1,342 (81.73)	
13–14 years	629 (21.15)	329 (24.70)	300 (18.27)	
Age expected grade or higher	2,934 (98.66)	1,302 (97.75)	1,632 (99.39)	≤.001
Household composition				.016
No parents	117 (3.93)	67 (5.03)	50 (3.05)	
Single parent	223 (7.50)	93 (6.98)	130 (7.92)	
Both parents	2,634 (88.57)	1,172 (87.99)	1,462 (89.04)	
Parent closeness	2,652 (89.17)	1,175 (88.21)	1,477 (89.95)	.13
Parent awareness	1,962 (65.97)	799 (59.98)	1,163 (70.83)	≤.001
Lifetime alcohol use	97 (3.26)	81 (6.08)	16 (.97)	≤.001
Lifetime tobacco use	239 (8.04)	221 (16.59)	18 (1.10)	≤.001
History of ACE				≤.001
0	544 (18.29)	213 (15.99)	331 (20.16)	
1	493 (16.58)	220 (16.52)	273 (16.63)	
2	489 (16.44)	178 (13.36)	311 (18.94)	
3	470 (15.80)	205 (15.39)	265 (16.14)	
4 or more	978 (32.89)	516 (38.74)	462 (28.14)	
Perceptions of sexual double standard (≥median = more unequitable)	1,577 (53.03)	713 (53.53)	864 (52.62)	.62
Perceptions of gender stereotypical trait (≥median = more unequitable)	1,695 (56.99)	789 (59.23)	906 (55.18)	.03
Peer-violence perpetration in the last 6 months	521 (17.52)	322 (24.17)	199 (12.12)	≤.001

ACE = adverse childhood experience; GEAS = Global Early Adolescent Study.

ranging from 7.51% among those with no exposure to 40.70% among those exposed to four or more ACEs (Table 3). The corresponding figures for girls ranged from 4.83% to 24.89% (Table 3). Perpetration of peer-violence was also associated with adolescent boys' perceptions of gender norms. Boys who perceived more gender equitable views as measured by the SDS and GST were less likely to report perpetrating peer-violence compared to those who had less equitable views (Table 3). We found no similar associations among girls.

#### Multivariable association between adverse childhood experience, gender norm perceptions, and peer violence

In the multivariable analysis (Table 4), ACE remained associated with peer-violence perpetration for both boys and girls, with odds of perpetration increasing more than two-fold among boys who experienced two and three ACEs respectively (adjusted odds ratio [aOR] 2.79, 95% CI 1.46–5.32 and 2.53, 95% CI 1.34–4.79), and rising to 6.95 (95% CI 3.98–12.12) among boys who had exposure to four or more ACEs. Similarly, though somewhat weaker statistical associations were found among girls, who had 1.87 times the odds of peer-violence perpetration when exposed

to three ACE (95% CI .97–3.60) and 5.50 times (95% CI 3.15–9.58) when exposed to four ACEs or more. These associations remained significant and virtually unchanged when adjusting for gender norms perceptions, with no significant difference in the effect of ACE on peer-violence perpetration between boys and girls. Gender norm perceptions did not moderate the relationship between ACE and peer-violence perpetration (test of interaction  $p$  value = .5 for boys and .6 for girls) but unequal perceptions of SDS were independently associated with peer-violence perpetration among boys but not girls (aOR 1.46, 95% CI 1.09–1.95). Other factors associated with greater peer-violence perpetration included tobacco use among boys and girls and alcohol use among boys. Parent closeness was associated with lower odds of peer-violence perpetration for girls but not boys.

## Discussion

Our results indicate that adolescents living in urban poor communities in Indonesia face high levels of peer-violence perpetration when poly-victimization in the form of four or more ACEs has been experienced. The association between ACE and peer-violence perpetration was not amplified by young

**Table 2**

Relationship between gender norm perceptions (SDS, GST) and ACE stratified by sex among GEAS participants in Indonesia

History of ACE	Boys				Girls			
	SDS ≥ median		GST ≥ median		SDS ≥ median		GST ≥ median	
	%	p value						
0	47.42	≤.001	48.36	≤.001	45.32	.002	50.45	.24
1	48.18		59.09		50.92		53.38	
2	44.94		55.62		49.52		56.59	
3	52.20		56.10		56.98		55.47	
4 or more	61.82		66.28		58.44		58.44	

ACE = adverse childhood experience; GEAS = Global Early Adolescent Study; GST = gender stereotypical trait; SDS = sexual double standard.

**Table 3**

Peer violence perpetration as a function of ACE history and gender norm perceptions (SDS and GST) among boys and girls participating in GEAS study in Indonesia

	Boys		Girls	
	% Peer-violence perpetration	<i>p</i> -value	% Peer-violence perpetration	<i>p</i> -value
History of ACE				
0	7.51	≤.001	4.83	≤.001
1	9.55		7.33	
2	19.66		7.07	
3	19.51		9.81	
4 or more	40.70		24.89	
Perceptions of sexual double standard				
<Median (more equitable)	18.42	≤.001	10.80	.12
≥Median (less equitable)	29.17		13.31	
Perceptions of gender stereotypical trait				
<Median (more equitable)	20.81	.017	11.55	.54
≥Median (less equitable)	26.49		12.58	

ACE = adverse childhood experience; GEAS = Global Early Adolescent Study; GST = gender stereotypical trait; SDS = sexual double standard.

people's perceptions of unequal gender norms although boys who perceived an SDS had increased odds of perpetrating peer-violence. These findings showing the relationship between peer-violence perpetration and ACE have been shown in previous studies conducted in high income settings [8,9].

Our results show that boys are significantly more exposed to childhood adversities than are girls and may in part explain the sex differences that are seen in peer-violence perpetration. Previous literature has shown the relationship between ACE and other forms of violence including violence against women and interpersonal violence, with the perspective that males/boys are perpetrators and women/girls are victims [8,9]. However, we see that boys are victims as well as perpetrators in our study. The increasing risk of aggression with cumulative ACE exposure was similar for boys and girls, in contrast with previous studies that have suggested that overall, girls have a lower risk for violence perpetration but exposure to emotional and physical abuse during childhood increase their risk for violence perpetration in the future [21]. However, this finding was limited to a sample in the U.S. and the predictor was child maltreatment defined by physical abuse, neglect, sexual abuse, and emotional and psychological abuse [21]. Other studies have either found no differences by sex or a greater risk of violence perpetration for boys [9].

Consistent with studies linking hegemonic forms of masculinity to violence perpetration [12,33], we found that more unequal perceptions of an SDS correlated with increased peer-violence perpetration for boys. Surprisingly, the same was not true for stereotypical gender traits portraying boys as tough and girls as weak. This finding highlights the multifaceted nature of gender norm perceptions, which are not necessarily consistent across domains, and have different implications for different spheres of life [31]. This may also be due to the fact that we did not explore young peoples' perceptions of interpersonal and gender-based violence acceptance in their milieu; the Indonesia Demographic and Health Survey 2017 found that justification for wife beating is highest among both young men and women aged 15–19 compared to older reproductive age groups [34]. Another study conducted in the U.S. investigated the relationship between neighborhood disadvantage, cultural norms, and abuse-violence relationship among youth [35]. This study found similar results to our study by demonstrating that neighborhood cultural norms did not moderate the abuse-violence relationship, but had a direct impact on violence [35].

Although there have been no nationally representative studies on norms and acceptance of peer-violence and the reasons behind such violence in Indonesia, ethnographic studies among schoolboy gangs suggest that young men justify peer-violence to establish and defend honor, respect, and hierarchy, to show solidarity, but also simply for fun [23,36]. Bullying in school is often trivialized by both students and teachers, arguing that bullying was mostly “just for fun” [26]. A 2008 national study among eighth graders in Indonesia found that more than 10% of students reported that they were “made to do things that I didn't want” and were “left out of activities by other students,” and that a higher proportion of male students reported these two types of bullying in comparison to female students [37]. School bullying is also normalized as, until recently, it was a tradition in many middle and high schools in Indonesia to initiate the freshmen class with a weeklong hazing. The need to assert power and gain affiliation within peer network and the school climate that condones bullying might be the more relevant influences than gender-unequal attitudes on peer-violence among adolescents.

#### Limitations

First, this is a cross-sectional study which affects the ability to determine causality. Subsequent analysis, using the longitudinal design of the GEAS study should provide more insights on the effects of ACE on peer-violence perpetration and other forms of violence over time. Second, gender norms were only captured through the SDS and GST measures, which limit the ability to thoroughly understand the influence of gender norms and community acceptance of violence on individual behaviors. Third, the measure of peer-violence perpetration was limited to two questions which might not adequately capture a broader range of peer-violence, including social bullying. Fourth, the sensitive nature of asking about both ACE and violence may have led to social-desirability bias; however, the questionnaire was self-completed and confidential, reducing this potential effect. Fifth, there was a lack of information about timing, frequency, and severity of both ACE and peer-violence perpetration. Sixth, the sample sizes were relatively small when considering sex stratified analysis of peer-violence perpetration in relation to number of ACEs, leading to large CIs. Finally, the generalizability of these findings is limited to the sites in Indonesia where the study was conducted.

**Table 4**  
Multivariable relationship between ACE and peer-violence perpetration for boys and girls in GEAS, Indonesia

	Boys (n = 1,332)		Girls (n = 1,642)	
	aOR (95% CI) peer-violence (model 1 adjusted for covariates)	aOR (95% CI) peer-violence (model 2 adjusted for covariates + gender norms)	aOR (95% CI) peer-violence (model 1 adjusted for covariates)	aOR (95% CI) peer-violence (model 2 adjusted for covariates + gender norms)
History of ACE				
0	Reference	Reference	Reference	Reference
1	1.21 (.60–2.44)	1.20 (.60–2.43)	1.57 (.79–3.12)	1.56 (.79–3.09)
2	2.79 (1.46–5.32) <sup>‡</sup>	2.86 (1.49–5.46) <sup>‡</sup>	1.50 (.77–2.94)	1.49 (.76–2.91)
3	2.53 (1.34–4.79) <sup>‡</sup>	2.51 (1.32–4.75) <sup>‡</sup>	1.87 (.97–3.60) <sup>*</sup>	1.82 (.95–3.52) <sup>‡</sup>
4 or more	6.95 (3.98–12.12) <sup>§</sup>	6.75 (3.86–11.80) <sup>§</sup>	5.50 (3.15–9.58) <sup>‡</sup>	5.37 (3.07–9.37) <sup>§</sup>
SDS ≥ median (more inequitable)		1.46 (1.09–1.95) <sup>‡</sup>		1.21 (.87–1.67)
GST ≥ median (more inequitable)		.93 (.68–1.25)		1.01 (.73–1.40)
City				
Bandar Lampung	Reference	Reference	Reference	Reference
Denpasar	.79 (.53–1.16)	.79 (.53–1.18)	.74 (.47–1.16)	.73 (.46–1.14)
Semarang	.99 (.67–1.46)	1.03 (.70–1.53)	1.13 (.74–1.73)	1.12 (.73–1.72)
Age				
10–12 years	Reference	Reference	Reference	Reference
13–14 years	.99 (.70–1.39)	.99 (.70–1.39)	1.17 (.78–1.75)	1.17 (.78–1.75)
Education attainment: Age expected grade or higher	1.23 (.46–3.25)	1.19 (.44–3.18)	.44 (.10–1.92)	.45 (.10–1.97)
Wealth index				
Bottom 33 percentile	Reference	Reference	Reference	Reference
34th–66th percentile	.76 (.53–1.07)	.75 (.53–1.07)	.88 (.59–1.30)	.87 (.59–1.29)
Top 33 percentile	.96 (.66–1.41)	.94 (.64–1.38)	1.13 (.76–1.70)	1.13 (.75–1.68)
Household composition				
No parents	Reference	Reference	Reference	Reference
Single parents	.85 (.39–1.86)	.84 (.39–1.84)	1.86 (.71–4.84)	1.91 (.73–5.01)
Both parents	.66 (.36–1.21)	.67 (.36–1.24)	.88 (.37–2.13)	.90 (.37–2.16)
Parent closeness	.95 (.62–1.46)	.94 (.61–1.46)	.55 (.35–.85) <sup>‡</sup>	.55 (.35–.85) <sup>‡</sup>
Parent awareness	1.04 (.78–1.39)	1.03 (.77–1.38)	.89 (.63–1.25)	.88 (.62–1.24)
Lifetime alcohol use	4.25 (2.46–7.32) <sup>§</sup>	3.95 (2.28–6.82) <sup>§</sup>	2.70 (.78–9.37)	2.79 (.81–9.66)
Lifetime tobacco use	3.06 (2.13–4.39) <sup>§</sup>	3.05 (2.12–4.40) <sup>§</sup>	4.90 (1.68–14.30) <sup>‡</sup>	4.81 (1.65–14.02) <sup>‡</sup>

ACE = adverse childhood experience; aOR = adjusted odds ratio; CI = confidence interval; GEAS = Global Early Adolescent Study; GST = gender stereotypical trait; SDS = sexual double standard.

\*  $p \leq 0.1$ .

†  $p \leq .05$ .

‡  $p \leq .01$ .

§  $p \leq .001$ .

Despite these limitations, this study is one of the first to assess the moderating role of gender norms on the relationship between ACE and peer-violence perpetration among early adolescents living in an LMIC settings. We used validated measures of gender norms perceptions and ACE, developed and tested during the extensive formative phase of the GEAS [38–40]. We also compared these processes among girls and boys, who have different patterns of exposures and behaviors with respect to adversities and violence, shedding light on the consequences of ACE on adolescent health behaviors for both sexes.

Our findings have important programmatic implications, highlighting the need to support young people who face adversities at a young age. Gender transformative interventions that challenge notions of hypermasculinity may reduce overall levels of male aggression, but do not address how childhood adversities link to subsequent aggression. Such approaches need to be supplemented with trauma-informed care, to address the specific psychological and social needs of adolescents who face adversities.

## Conclusion

Based on the research in three Indonesian communities, this study demonstrates that boys are disproportionately exposed to

adversities including history of ACE, inequitable SDS, lifetime alcohol use and tobacco use in comparison to girls. However, it is unclear to what extent these exposures explain the higher rates of peer-violence perpetration by boys than girls. The results demonstrate that the relationship between exposure to childhood adversities are associated with peer-violence perpetration, as reported previously within literature in high income settings [8,9]. Programs targeting ACE and gender norms which engage boys, girls, and families are more likely to be successful in reducing peer-violence perpetration and promoting gender equitable norms.

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### Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jadohealth.2021.01.025>.

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