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Original article

Association Between Early Menarche and School Bullying

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A B S T R A C T

Purpose: Early pubertal onset may relate to more involvement in bullying in adolescent girls, both as a target and as a perpetrator. However, the few studies of the association between early menarche and school bullying have shown mixed findings. The present study examined whether early menarche is associated with bullying victimization and perpetration.
Methods: We obtained survey data on adolescent girls from the 2001–2002, 2005–2006, and 2009–2010 cycles of the Health Behaviour in School-aged Children study in 35 European and North American countries. We identified school bullying in the past 2 months using the Revised Olweus Bully/Victim Questionnaire. We defined early menarche as a reported onset of menarche before 11 years and tested the associations between early menarche and bullying victimization and perpetration using three-level logistic regression models.
Results: The sample included 227,443 adolescent girls with a mean age of 13.64 (standard deviation [SD] 1.63) years, of which 10,172 (4.47%) were early matured; 62,528 (28.33%) and 56,582 (25.67%) were occasional victims and perpetrators, respectively; and 21,985 (9.96%) and 14,115 (6.40%) were frequent victims and perpetrators, respectively. Early menarche related to occasional victimization (adjusted odds ratio [OR] [95% confidence interval [CI] = 1.21 [1.12–1.31]) and perpetration (aOR [95% CI] = 1.19 [1.11–1.27]) and to frequent victimization (aOR [95% CI] = 1.35 [1.22–1.50]) and perpetration (aOR [95% CI] = 1.46 [1.31–1.63]).
Conclusions: Early menarche in European and North American adolescent girls positively relates to bullying victimization and perpetration. Early-maturing girls should not be neglected in antibullying programs.

IMPLICATIONS AND CONTRIBUTION

There have been few studies of early menarche and school bullying, and the findings are mixed and inconclusive. In this multinational, cross-sectional study of 227,443 adolescent girls in 35 countries, early menarche was associated with increased risks of both victimization and perpetration.

School bullying is a serious and common negative life event in adolescents. Bullying is defined as intentional aggressive behaviors that involves a real or perceived power imbalance and that repeatedly occurs over time [1,2]. Bullying victimization and perpetration impact vast numbers of adolescents globally, making it a significant public health concern. Results from the Health

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Behaviour in School-aged Children (HBSC) study in 33 countries found that the prevalence of being bullied ranged from 33.5% in 2002 to 29.2% in 2010 [2]. Adolescents involved in school bullying, both as victims and as perpetrators, are more likely to suffer psychiatric symptoms in childhood [3] and mental disorder in adulthood, especially depression [4]. There is also a link between school bullying and behavioral problems [5].

Menarche is a milestone in female pubertal development that affects both the body and the identity as it signals the onset of reproductive capacity [6]. Menarche occurs late in the pubertal cycle, and its timing varies because of complex gene-environment interactions [6]. Studies have found that early menarche increases the risks of adverse health outcomes in adulthood, including cardiovascular and metabolic disease, breast cancer, type 2 diabetes, and overall mortality [7–9]. Early menarche has also been linked to increased health risk behaviors during childhood, including eating disorders and earlier sexual debut [10,11].

Given that early maturing adolescent girls have been observed to have more behavioral problems than other girls, we hypothesized that early menarche also relates to school bullying. Early maturation can be a target of teasing, discrimination, and victimization, and, in turn, may contribute to retaliatory aggressive behaviors [12]. The few existing studies of the relation between early menarche and school bullying showed mixed results. One study reported a strong association between early menarche and victimization [13], whereas another study detected no associations between pubertal timing and bullying victimization and perpetration [12]. These two studies were both conducted on Finnish adolescents and therefore the findings cannot be generalized to other cultures.

To address this gap, we investigated the associations of early menarche with bullying victimization and perpetration using cross-national data from the HBSC study in 35 North American and European countries. We hypothesized that adolescent girls with early menarche are more likely to be bullied and bully others, occasionally and frequently, compared with their non-involved peers.

Methods

Study design and participants

The data in the present study were drawn from the 2001–2002, 2005–2006, and 2009–2010 cycles of the HBSC study; the three cycles of datasets are available for public use (www.hbsc.org/news/index.aspx?ni=3473). The HBSC study is a school-based cross-sectional survey conducted every 4 years in 45 countries and regions across Europe and North America in collaboration with the World Health Organization. HBSC data collection follows an international protocol and standardized self-report questionnaires that are administered in classroom settings [14]. The three HBSC cycles included 581,838 adolescents aged 11, 13, and 15 years (285,082 were male and 296,756 were female). Of the female adolescents, 65,788 had missing data on age at menarche and 2,051 had missing birth dates, leaving a sample of 229,566. Age at menarche was not collected in some countries (Armenia, Bulgaria, Russia, and Turkey). Female adolescents aged less than 11 years who had not experienced menarche were excluded from the analysis, resulting in the final sample size of 227,443 from 35 countries: Austria, Belgium (French and Flanders regions), Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Greenland, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, Macedonia, UK (England, Scotland, and Wales), and USA.

The study was reviewed and approved separately by institutional review boards in each country. Parental consent procedures (active or passive) depended on school policies, and all participants provided active informed consent before participation.

Measures

Early menarche. We defined early menarche as a self-reported onset of menarche before 11 years of age [15]. Age at menarche was assessed using the month and year of the occurrence of the first menstrual cycle using the following question: "Have you already had your periods?" with options 1 "No, I haven't yet" and 2 "Yes, I have at the age of (year, month)" [15].

School bullying. We measured school bullying using two questions that have been widely used and validated in multiple countries [16]: "How often have you bullied others at school in the past couple of months?" with options 0 = I haven't been bullied, 1 = Once or twice, 2 = 2 or 3 times a month, 3 = About once a week, 4 = Several times a week, and "How often have you been bullied at school in the past couple of months?" with options 0 = I haven't bullied others, 1 = Once or twice, 2 = 2 or 3 times a month, 3 = About once a week, 4 = Several times a week [17]. We identified occasional bullying or victimization by responses of 1, 2, or 3 (from once or twice a week to weekly) and frequent bullying or victimization by responses of 4 (several times a week) [2]. A definitional statement of bullying preceded these questions to ensure comparability of responses [1].

Covariates. We controlled differences in weight status, family structure, family socioeconomic status (SES), diet quality, and classmate support because research suggests that the variables mentioned relate to both sexual maturation [18–22] and school bullying [23–25], and are not in the causal pathway between sexual maturation and school bullying.

Weight status. We assessed the participants' weight status by calculating body mass index (BMI, weight/height^2) based on self-reported weight and height. We created four groups (underweight, normal weight, overweight, and obese) according to the international BMI cut-offs [26] using the Stata extension *zbmicat* [27].

Family structure. We recorded family structure as either "two biological parents" or "other types" if the participant lived with a "single mother," "single father," in a "reconstituted family," or "other" [15].

Family socioeconomic status. We controlled some variation in family SES using the HBSC Family Affluence Scale (FAS) [17,28] The scale is composed of four items (number of cars, holidays, computers, and bedrooms) and has a total score that ranges from 0 (lowest) to 9 (highest). The FAS has been found to be a better proxy of SES than measures that rely on adolescent reports of parental occupation or income [28]. We categorized the sample into groups of low, medium, and high SES [29].

Diet quality. We assessed diet quality using four items that measured consumption of fruits, vegetables, sweets, and Coke or other