

# Victimization, Aggression, and Visits to the School Nurse for Somatic Complaints, Illnesses, and Physical Injuries



**WHAT'S KNOWN ON THIS SUBJECT:** Children who are frequent targets (victims) or perpetrators of peer aggression are at increased risk for psychosocial problems. Linkages between health and involvement in peer aggression have been proposed, but research evidence remains sparse.



**WHAT THIS STUDY ADDS:** This study shows that self-reported victimization and classmate-reported aggression toward peers are both associated with more frequent visits to a school nurse for illness with objective symptoms, somatic complaints without objective symptoms, and injuries.

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## KEY WORDS

peer victimization, aggression, school nurse visits, injury, somatic complaints, illness

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## abstract

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**OBJECTIVE:** To examine how involvement in aggressor-victim interactions is linked to somatic complaints, illnesses, and physical injuries among elementary school-aged children.

**STUDY DESIGN:** This study was composed of a school-based sample of 590 children in grades 3 through 5. Independent sources were used to assess victimization (self-report) and aggression (peer report) in the fall semester. School nursing logs for the entire school year were collected in May and coded for the number of times each child presented with a somatic complaint, illness, or injury.

**RESULTS:** Both aggression and victimization were significantly related to all 3 reasons for nurse visits, controlling for demographic variables. Higher levels of aggression and victimization each were independently associated with more frequent visits to the school nurse for somatic complaints, illnesses, and injuries. A significant victimization-times-aggression interaction was found for illnesses, with nonaggressive victimized children presenting most frequently for illness visits.

**CONCLUSIONS:** Involvement in aggressor-victim interactions, as either aggressor, victim, or both, is associated with more frequent health complaints, based on school nursing logs. Prevention, early identification, and treatment of problems with victimization and aggression may have important health implications for children. *Pediatrics* 2011;127:842–848

Peer victimization is a prevalent problem with special relevance to pediatric practice. A recent American Academy of Pediatrics<sup>1</sup> policy statement highlighted the role of pediatricians in addressing peer victimization issues, calling for increased involvement in screening, prevention, and referral for treatment. This study examined whether documented visits to a school nurse for injuries, illnesses, and somatic complaints with no objective sign of illness might be related to children's involvement in peer victimization as perpetrators or targets of aggression.

A significant body of literature has linked being the frequent target of peer aggression (victimization) to increased risk for anxiety and depression in childhood<sup>2-4</sup> as well as psychiatric problems in adulthood.<sup>5,6</sup> Emerging evidence suggests that victimization also could have significant physical health implications. Nishina et al<sup>7</sup> found that victimization predicted the development of somatic symptoms over the course of the school year for sixth-grade students. Similarly, Fekkes et al<sup>8</sup> reported that victimization longitudinally predicted somatic symptoms in a sample of children aged 9 to 11 years. Cross-sectional research also has reported an association between victimization and medication use for pain among adolescents.<sup>9</sup>

Extant research linking peer victimization and physical health outcomes in children has several limitations. First, previous research on peer victimization and pediatric health has relied on self-report of physical symptoms, raising issues of validity and potential problems with common method variance. More objective, behavioral indicators of physical health symptoms have been lacking in studies of peer victimization. Second, the conceptualization of physical health in previous

studies has been largely limited to subjective somatic symptoms, such as headaches, stomachaches, and nausea. The relationship between victimization and injuries or physical illness with objective indicators, such as fever or vomiting, is less often studied. Third, research in this area has primarily focused on the health symptoms of victims of peer aggression. Less is known about the physical health symptoms of the perpetrators of aggression, although aggressive children have increased risk for mental health problems.<sup>3</sup> Fourth, the interplay between aggression and victimization in relation to health merits attention. Passive (nonaggressive) victims have been described as more withdrawn and submissive, whereas aggressive victims appear to have more difficulty regulating their emotions and to escalate or prolong aggressive interactions.<sup>10</sup>

Several factors could lead to a relationship between victimization, aggression, and child health. Aggressive interactions with peers may be stressful for both aggressors and victims, and the stress of these encounters could be a trigger for somatic symptoms. Stressful events have been linked to somatic symptoms, both in general and on the day of the stressor.<sup>11,12</sup> Repeated involvement as a target or perpetrator of aggression could compromise a child's immune system over time through physiologic processes associated with stress.<sup>13</sup> For children who already are predisposed to somatic symptoms (eg, headaches and stomachaches), negative peer interactions could exacerbate existing symptoms.<sup>14</sup> Emotional symptoms, such as depression, anxiety, and anger, which may accompany aggressive exchanges, have been shown to relate to the morbidity and severity of some health complaints.<sup>15</sup> Children involved in aggressor-victim situations may be at in-

creased risk for physical altercations, leading to an increased risk for injuries. Finally, visiting the school nurse could be an escape strategy for some children who are chronically involved in unpleasant peer interactions.<sup>16</sup>

The current study used school nursing logs as an objective, behavioral indicator of children's health status. School nursing logs have been used in previous research on school violence prevention<sup>17,18</sup> and can be coded to provide valuable information about the nature of the child's health complaint. Here, we coded nursing logs for somatic complaints, physical illnesses, and physical injuries. Based on previous research, we hypothesized that involvement in victimization as a perpetrator, target, or both would be positively related to school nurse visits for somatic complaints, illnesses, and injuries.

## STUDY DESIGN

The participants included 590 children (51.7% girls) from grades 3 through 5 (183 third, 210 fourth, and 197 fifth graders) from 6 public elementary schools in a large central city in the Midwestern United States. The sample was ethnically (64.5% white, 17% African American, 16% Hispanic American, 1.7% Native American, and 0.8% Asian American) and economically diverse. Socioeconomic status was measured by school records on lunch-fee status, with 15.8% receiving reduced prices and 37.5% receiving free lunches. All students were involved in a larger research project studying school violence.<sup>19</sup> Nursing logs were available for 6 of 9 schools that had agreed to participate in the Fonagy et al<sup>19</sup> study. The study was reviewed and approved by the institutional review board of the Menninger Clinic. All third through fifth graders in these schools were eligible to participate, and written parental permission and child assent were ob-

**TABLE 1** Nursing Log Coding Decision Rules

	Codes
No code	Routine, scheduled visits for medications and inhalers. Head lice and chapped lips also are considered as No Code. Anything that is not an obvious illness, somatic complaint, or injury is considered No Code. Also used for dental complaints.
Somatic complaint	Somatic complaint with no obvious, objective sign of illness. Examples include stomachache or headache with no fever or vomiting. Student is not sent home by nurse.
Illness	Illness complaint with a physical sign of illness, such as fever or vomiting. Student is recommended to be sent home by nurse.
Injury	Any complaint of an injury including falls, being pushed, being hit, requesting a Band-Aid, are coded as Injury.

tained for 74% of students. Participating students were similar in gender, ethnicity, and family income to overall school demographics for these 6 schools. Trained research assistants administered measures of victimization and aggression during classroom time in October or November. Copies of school nursing logs for the entire school year (2000–2001) were collected in May and coded by a trained research assistant.

## Measures

### Nursing Logs

School nurses completed nursing logs as a part of the schools' standard procedures. Nurses generally recorded at least the student's name, date, complaint, and action taken to remedy the complaint for each visit. Using a procedure modified from Krug et al,<sup>18</sup> each complaint was later coded into 1 of 4 categories: (1) no code (given for routine visits); (2) somatic complaint; (3) illness; or (4) injury (see Table 1 for specific coding criteria). A second research assistant coded 18% of the logs, and acceptable interrater reliability was established ( $\kappa = 0.79$ ,  $P < .01$ ). Only complaints coded as somatic, illness, or injury were used in the analyses; visits coded as no code were not used because such visits were considered unlikely to be related to aggressor-victim problems.

### Victimization

Consistent with previous research on victimization and health,<sup>7,8</sup> victimization by peers was assessed using self-report. Because victimization often goes unnoticed by peers and teachers, self-report was considered the most valid indicator of victimization.<sup>20</sup> Participants completed a downward extension of the Peer Experiences Questionnaire used in previous research<sup>21,22</sup> and the Victimization of Self Scale of this measure was used in this study. The Victimization of Self Scale includes 10 items sampling various forms of victimization, including overt (eg, "A kid hit, kicked or grabbed me in a mean way") and relational (eg, "A kid told lies about me so other kids wouldn't like me") aggression. Children indicated on a 5-point Likert scale (never, once or twice, a few times, about once a week, and a few times a week) how often each of the items applied to them over the previous 3 months. Possible and observed scores ranged from 10 to 50. The Victimization of Self Scale has good internal consistency ( $\alpha = 0.91$ ) and moderate stability ( $r = 0.56$ ) over 6 months.<sup>23</sup>

### Aggression

Aggression was assessed using a peer nomination procedure that gives an indication of the child's reputation for acting aggressively. With regard to ag-

gression, self-report often is considered to have limited validity because children may underreport their own aggressive behavior because of social desirability.<sup>24</sup> Consequently, peer nomination of aggression frequently is used and considered a more valid measure. In this study, peer-reported aggression was obtained using an adapted version of the Social Environment Questionnaire,<sup>25</sup> which consists of 18 items. Using a roster of participating classmates, children were asked to circle the names of classmates who fit the behavior described in the item. The number of classmates providing nominations ranged from 7 to 23, depending on class size and participation rates. Major forms of aggression were sampled by 6 items, including overt (eg, "Hits, kicks, punches others") and relational (eg, "Tries to make other kids not like a certain person by spreading rumors about them") forms. A child's score was the mean proportion of classmates who nominated them as exhibiting each form of aggression. Internal consistency is adequate ( $\alpha = 0.85$  in this sample) and is quite stable over 6 months ( $r = 0.72$ ).<sup>23</sup>

## RESULTS

### Descriptive Statistics

The mean score on victimization for the entire sample was 15.94 (SD: 7.64). Victimization scores differed by grade [ $F(2,515) = 6.20$ ,  $P = .002$ ], with the highest mean among third graders (17.73), followed by fifth graders (15.52) and fourth graders (14.92). Scores on victimization did not significantly differ by gender [ $t(516) = 1.06$ ,  $P > .05$ ] or ethnicity [ $F(4,512) = 0.35$ ,  $P > .05$ ]. The mean aggression score for the entire sample was 0.60 (SD: 0.68). Aggression scores differed by grade [ $F(2,570) = 13.39$ ,  $P < .001$ ], with fifth graders (0.74) showing the highest mean, followed by third graders (0.66) and fourth graders (0.41).

**TABLE 2** Mean Number of Nurse Visits by Grade and Gender

Reason for visit	Grade			F	Gender		<i>t</i>
	3	4	5		Male	Female	
Somatic complaint	2.50	2.10	1.82	1.88	1.73	2.51	-2.77 <sup>a</sup>
Illness	0.70	0.61	0.53	1.25	0.50	0.72	-2.61 <sup>b</sup>
Injury	2.78	1.90	1.29	12.94 <sup>c</sup>	1.78	2.15	-1.57

<sup>a</sup>  $P < .05$ .<sup>b</sup>  $P < .01$ .<sup>c</sup>  $P < .001$ .

On average, boys had higher scores than girls on peer-reported aggression [ $t(571) = 6.57, P < .001$ ]. Aggression scores also differed by ethnicity [ $F(4,567) = 4.76, P = .001$ ], with African American children having the highest peer-reported mean score, followed by white children. The bivariate correlation between victimization and aggression was  $r = 0.22 (P < .001)$ . The mean number of total nurse visits per child was 4.71 (SD: 6.06 [range: 0–51]), including 2.13 (SD: 3.44) somatic complaints, 0.61 (SD: 1.03) for illnesses, and 1.97 (SD: 2.91) for injuries.

### Demographic Variables and School Nurse Visits

Potential connections between demographic factors (gender, grade, ethnic minority status, lunch-fee status) were evaluated using either bivariate correlations or analysis of variance. Only grade and gender were significantly related to any of the 3 types of nurse visits, with girls and younger children generally making more visits (see Table 2 for somatic, illness, and injury visit means presented by grade and gender).

### Overview of Regression Analyses

The main analyses were a series of hierarchical linear regressions with aggression or victimization predicting nurse visits for somatic complaints, illnesses, and injuries (each analyzed in a separate regression). In each analysis, demographic factors found to be related to nurse visits (ie, grade and gender) were controlled for by enter-

ing them as a set on the first step. Either aggression or victimization was entered on the second step, and the unique variance accounted for above and beyond demographic factors was analyzed. To control for family-wise type I error, we used a Holm-Bonferroni correction procedure to adjust the  $\alpha$  critical value to account for multiple analyses.<sup>26</sup> This sequential procedure involves ordering the  $P$  val-

ues in a group of tests from smallest to largest. The smallest  $P$  value is then compared with an adjusted level computed by calculating  $\alpha/\kappa$ , where  $\kappa$  is the number of comparisons in the group of tests (eg,  $0.05/6 = 0.008$  critical value). The next smallest  $P$  value is then compared with  $\alpha/(\kappa - 1)$ , and so on. A summary of the main regression analyses is presented in Table 3.

A final series of regressions investigated the interplay between aggression and victimization in predicting the 3 types of nurse visits. For these analyses, a third step using a mean-centered victimization-times-aggression interaction term was added to determine whether a significant interaction was present. When a significant interaction was found, the interaction was

**TABLE 3** Summary of Regression Analyses Predicting Nurse Visits for Somatic Complaints, Illnesses, and Injuries

Variable	$\beta$	$R^2\Delta$	$P$	Adjusted Critical Value	Statistically Significant
DV = Somatic complaints					
Step 1: demographics		0.027	.001		
Grade	-0.11				
Gender	0.12				
Step 2: victimization	0.09	0.008	.045	$\alpha/(6 - 5) = 0.05$	Yes
DV = Illness					
Step 1: demographics		0.021	.004		
Grade	-0.11				
Gender	0.10				
Step 2: victimization	0.18	0.031	<.001	$\alpha/6 = 0.0083$	Yes
DV = Injury					
Step 1: demographics		0.045	<.001		
Grade	-0.19				
Gender	0.07				
Step 2: victimization	0.14	0.019	.001	$\alpha/(6 - 3) = 0.0167$	Yes
DV = Somatic complaints					
Step 1: demographics		0.019	.004		
Grade	-0.09				
Gender	0.11				
Step 2: aggression	0.17	0.027	<.001	$\alpha/(6 - 1) = 0.01$	Yes
DV = Illness					
Step 1: demographics		0.016	.01		
Grade	-0.07				
Gender	0.10				
Step 2: aggression	0.14	0.019	.001	$\alpha/(6 - 4) = 0.025$	Yes
DV = Injury					
Step 1: demographics		0.049	<.001		
Grade	-0.21				
Gender	0.06				
Step 2: aggression	0.20	0.038	<.001	$\alpha/(6 - 2) = 0.0125$	Yes

Adjusted critical values were determined using the Holm-Bonferroni correction procedure discussed in the text. DV indicates dependent variable.

probed using procedures outlined by Aiken and West.<sup>27</sup>

### Victimization and Nurse Visits

Using somatic complaints as a dependent variable, grade and gender accounted for significant variance when entered on the first step of the regression analysis [ $F(2,515) = 7.11, P = .001$ ]. Victimization (entered on the second step) was a significant unique predictor, controlling for demographics ( $\beta = 0.09, R^2\Delta = 0.008, P < .05$ ). Using visits for illnesses as a dependent variable, gender and grade (entered on the first step) significantly predicted illness visits [ $F(2,515) = 5.46, P = .004$ ]. Victimization was a significant unique predictor of visits for illness when entered on the second step ( $\beta = 0.18, R^2\Delta = .031, P < .001$ ). For injury-related visits, gender and grade again accounted for significant variance [ $F(2,515) = 12.21, P < .001$ ]. Victimization, entered on the second step, was a significant unique predictor of visits for injury ( $\beta = 0.14, R^2\Delta = 0.019, P = .001$ ).

### Aggression and Nurse Visits

Using somatic complaints as the dependent variable, a significant effect was found for the demographic set [ $F(2,570) = 5.60, P = .004$ ]. Peer-reported aggression, entered on a second step, was a significant unique predictor of somatic complaints ( $\beta = 0.17, R^2\Delta = 0.027, P < .001$ ). With visits for illness as the dependent variable, the demographic set was a significant predictor [ $F(2,570) = 4.62, P < .05$ ]. Aggression (entered on step 2) was a significant unique predictor ( $\beta = 0.14, R^2\Delta = 0.019, P = .001$ ). With visits for injury as the dependent variable, the demographic set was a significant predictor [ $F(2,570) = 14.69, P < .001$ ]. Aggression, entered on the second step, was a significant unique predictor of visits for injury ( $\beta = 0.20, R^2\Delta = 0.038, P < .001$ ). All effects for victimization

and aggression remained significant after Holm-Bonferroni correction (Table 3).

### Victimization-Aggression Interactions

To examine the possible statistical interactions between victimization and aggression in predicting nurse visits, 3 regressions were conducted using a mean-centering approach. For each analysis, the demographic set was entered on the first step, followed by mean-centered scores for victimization and aggression on the second step and a centered victimization-times-aggression multiplicative interaction term on the third step. A significant victimization-times-aggression interaction effect was found for illness visits ( $R^2\Delta = 0.009, \beta = -0.10, P < .05$ ) but not for somatic complaints or injuries. Post hoc probing of this interaction revealed that among children rated as low (simple slope = 0.034,  $t = 3.88, P < .001$ ) to moderate (simple slope = 0.023,  $t = 3.83, P < .001$ ) on aggression, those who reported higher levels of victimization had a greater number of nurse visits for illnesses. Among children rated as high on aggression, higher levels of victimization did not significantly predict more visits for illnesses (simple slope = 0.012,  $t = 1.86, P > .05$ ).

### DISCUSSION

This study adds to the literature on peer victimization and health in several ways. First, a significant relationship between involvement in aggressor-victim interactions and child health was found using objective behavioral indicators of health complaints rather than the self-report measures used in previous research. Second, this study examined a broader range of child health complaints, including not only somatic symptoms but also physical illness and injury, and found a significant relationship be-

tween aggressor-victim involvement and all 3 health indicators. Third, this study investigated both victimization and aggression using independent sources of information, finding that children who were viewed by peers as acting aggressively also were at an increased risk for visiting the nurse's office. Overall, the results of this study suggest that involvement in aggressor-victim interactions, as an aggressor, victim, or both, is associated with increased somatic, illness, and injury complaints to the school nurse over the course of an entire school year.

The statistical interaction between victimization and bullying in predicting visits for illness represents a new finding in the literature on peer victimization and child health. Children who are victimized but not aggressive themselves, sometimes referred to as passive victims,<sup>10</sup> may be seen as easy targets for bullying, leading to more chronic victimization. The fact that aggression was measured by peer nomination adds weight to this interpretation because children with low scores on this measure apparently had reputations among classmates for seldom acting aggressive. Chronic victimization may, in turn, increase the risk for immune compromise over time, leading to more frequent illnesses. More research is needed to investigate the potential effects of chronic victimization on immune functioning and subsequent health outcomes.

A child's involvement as a target or perpetrator of aggression may not always be apparent to adults. Frequent visits to the school nurse may be viewed as a useful "red flag" indicator of such problems. The child may not report problems with victimization or aggression unless asked directly, but assessment of peer interactions and appropriate intervention may be crucial for the child's emotional and physical well-being.

### Limitations and Future Directions

Several limitations of the current study should be noted. First, nursing logs, although a useful and objective measure of children's health complaints, are not a perfect measure of pediatric health. Rather, they are a proxy measure of health and capture 1 form of help-seeking behavior for health issues. Future research should use more rigorous measures of health outcomes, including data from physical examinations and medical diagnoses, to further examine the relationship between aggressor-victim interactions and child health. Second, the current study was conducted over a relatively short period of time (ie, 1 school year), so the long-term health effects of aggression and victimization could not be studied. Although our design was longitudinal, future research should examine more long-term health outcomes. Third, the current study

reports on correlations between aggression, victimization, and health, but it is not able to establish a causal relationship. Health conditions, such as obesity, asthma, or diabetes, may be associated with both peer victimization and nurse visits.<sup>28</sup> Finally, although significant relationships were found between aggressor-victim interactions and all 3 types of nurse visits, the effect sizes for these analyses were relatively small. The relatively short duration of the study may contribute to the small effect sizes because more long-term processes are not captured. It is also possible that these statistically significant effects represent relatively small clinical effects for individual children in many instances.

### CONCLUSIONS

The results of this study suggest that involvement in aggressor-victim inter-

actions can have negative effects on children's health, as measured by visits to the school nurse's office. These results support the importance of pediatrician involvement in addressing problems of victimization and aggression, as advocated by the American Academy of Pediatrics.<sup>1</sup> Pediatricians and other health professionals should be actively involved in screening for aggression and victimization problems, preventing such problems, and facilitating appropriate intervention when necessary. The current study suggests that such efforts should focus not only victimization experiences but also perpetration of aggression, because both may have health implications. Prevention, early identification, and treatment of aggressor-victim problems should be a priority for pediatric health care providers in promoting the mental and physical health of children.

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**CLUES TO LONGEVITY:** Throughout recorded history, men have been searching for the keys to longevity. Now, according to an article in *The New York Times (Science: February 16, 2011)*, at least one clue to a long life span has been found in a group of Ecuadoran villagers. The villagers, descendents of Sephardic Jews from Spain and Portugal, have Laron syndrome, a type of dwarfism characterized by an abnormal growth hormone receptor that renders cells mostly unresponsive to growth hormone. While the villagers are quite short, only three and half feet tall, they have no evidence of either cancer or diabetes, two of the most common age related diseases. The absence of diabetes is all the more surprising given the high rate of obesity. The hypothesis is that because cells cannot respond to growth hormone, little or no insulinlike growth factor, IGF-1, is made. Why low IGF-1 levels are associated with longevity is not known but animal models have confirmed that low IGF-1 levels or poor IGF-1 signaling are associated with long life spans. Round worms lacking the receptor for IGF-1 live twice as long as usual. Mice with a genetic defect similar to that seen in Laron syndrome patients live 40% longer than usual. In vitro experiments have shown that serum from patients with Laron syndrome protect human cells from damage. As reported in the article, in cells with chemically induced DNA damage, addition of Laron syndrome patient sera induced apoptosis, possibly helping to prevent malignant transformation. Both of these protective processes were reversed with the addition of IGF-1 to the serum. Unfortunately, Ecuadoran villagers with Laron syndrome, while youthful appearing for their age, do not live longer than expected. That is because they have very high death rates from diseases unrelated to age such as alcoholism and injury. It would seem that longevity is dependent not only on genes but behavior.

Noted by WVR, MD

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Eric M. Vernberg, Timothy D. Nelson, Peter Fonagy and Stuart W. Twemlow  
*Pediatrics* originally published online April 25, 2011;

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