SAGE Open Nursing
Volume 5: 1–7
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DOI: 10.1177/2377960819887556
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Bullying and Pain in School-Aged Children and Adolescents: A Cross-Sectional Study

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Abstract

Bullying is defined as repeated and unwanted aggressive behavior involving a power imbalance and hurt children and adolescents' socioemotional functioning. The aim is to investigate associations between pain (headache, stomach pain, backache, and neck/shoulder pain) and bullying among school-aged children and adolescents. This cross-sectional school-based survey comes from the Icelandic data set in the international research network Health Behaviour in School-Aged Children. The study population included all Icelandic students in Grades 6, 8, and 10 (ages 11, 13, and 15 years, respectively; participation rate, 84%; $n = 10{,}626$). An anonymous standardized questionnaire was distributed and completed by students in their classrooms. About every 8 in 10 bullied students reported weekly pain (79%), compared with little over half of nonbullied students (57%). The prevalence of pain was significantly higher among bullied students compared with their nonbullied peers. Being a bullying victim was associated with an increased frequency of experiencing headaches, stomachaches, and back pain, in addition to neck or shoulder pain. It is important for mental health nurses and health professionals to ask about pain when meeting with children and adolescents as well as to inquire about their peer relationships.

Keywords

bullying, pain, self-reported health, school-aged children, adolescents, cross-sectional study, Health Behaviour in School-aged Children

Date received: 6 June 2019; revised: 22 September 2019; accepted: 18 October 2019

Introduction

Bullying is a pervasive peer relationship problem with psychological, social, and academic consequences (Annerback, Sahlqvist, & Wingren, 2014; Barzilay et al., 2017; Fahy et al., 2016; Landstedt & Persson, 2014; Waasdorp & Bradshaw, 2015). Studies have also indicated a possible association between bullying and physical symptoms, such as pain (Fridh, Kohler, Moden, Lindstrom, & Rosvall, 2018; Gini, Pozzoli, Lenzi, & Vieno, 2014) and the use of analgesics (Garmy, Hansson, Vilhjalmsson, & Kristjansdottir, 2019).

The Icelandic contribution to the research network Health Behaviour in School-aged Children showed that 5.5% of children and adolescents aged 11 to 15 years experienced victimization at least 2 to 3 times per month as a result of bullying (Garmy, Vilhjalmsson, & Kristjansdottir, 2018), compared with the 11% mean value in 43 countries in Europe and North America (Inchley et al., 2016). Bullying is preventable through school-based efforts (Beckman & Svensson, 2015), and the relatively low bullying percentage in Iceland might be the result of extensive work to reduce bullying in Icelandic schools (Garmy et al., 2018) or cultural differences in how the concept of *bullying* is interpreted, as the interpretation of bullying differs (Olweus, 1994). However, 5.5% is still a high proportion, indicating that about two to three students in every school class experience bullying.

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Pain is a complex phenomenon that is difficult to define. The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (Merskey & Bogduk, 1994, p. 209) and chronic pain is defined as pain lasting more than 3 months (Merskey & Bogduk, 1994), although the term has also been defined as persistent or recurrent pain (King et al., 2011).

Pain is ultimately a security system designed to preserve the integrity of the individual and his or her body. Protecting this integrity also requires interaction with the group; this is especially important for children and adolescents. Experiences of pain that follow from social rejection, exclusion, or loss use some of the same neural regions that process physical pain, but our understanding of the complex nature of the overlap remains incomplete (Eisenberger, 2015). However, researching the links between adverse social situations and physical pain enables us to understand further how our physical bodies are regulated by the world around us, including through the occurrence of bullying. Furthermore, motoric coordination, also linked with developing recurrent pain, relies on some of the same cerebellar pathways as social skills (Bejerot, Plenty, Humble, & Humble, 2013), making it important to investigate the links between bullying and the prevalence of recurrent pain.

A large-scale study (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006) showed that 19% of the European adult population suffers from moderate-to-severe chronic pain. Pain has a pervasive influence on life quality with respect to well-being, social factors, and work. One in five (21%) of these adults were diagnosed with depression in association with their pain (Breivik et al., 2006). When asked, 25% of children and adolescent report recurrent pain in the last 3 months (King et al., 2011). About 5% to 15% suffered from severe chronic pain. Severe chronic or recurrent pain has been defined as pain that is continuous or recurs at least once a week at a level assessed as $\geq$5 on a 10-point scale (King et al., 2011).

The most common areas of recurrent pain are the head, stomach, back, and the musculoskeletal system (Lundeberg & Olsson, 2016). One third of children or adolescents reporting chronic or persistent pain have pain in more than one place, and generalized pain is common. The prevalence increases with age. In adolescents, pain is twice as common among girls than boys (Kristjánsdóttir, 2016). Indications for recurrent pain include stress, anxiety, low self-esteem, depression and mood problems, pain in other family members, and problems at school (Lundeberg & Olsson, 2016), although these indications are mostly known as consequences of chronic or recurrent pain (Doan, Manders, & Wang, 2015).

Overall, the most common complaint in children and adolescents is headache. Migraine is reported in about 8% and tension headache in about 25% (Lundeberg & Olsson, 2016). A majority of children and adolescents with headache also have pain in other regions, which often includes the back or stomach. The second most common pain location is the stomach, and this pain is more often recurrent than continuous. Children and adolescents with back pain often have pain in other locations, and the most common combination is back pain in conjunction with headache or stomachache. The most common musculoskeletal pain consists of neck or shoulder pain (Myrtveit et al., 2014). This pain is recurrent rather than continuous, especially among younger children. This pain can be located in one or several places. A large Finnish study found the prevalence of musculoskeletal pain to be 32% among 10- to 12-year-old children (El-Metwally, Salminen, Auvinen, Kautiainen, & Mikkelsson, 2004). Risk factors for recurrent musculoskeletal pain were gender (more common among girls than boys), high levels of daily physical activity, and psychosomatic complaints (El-Metwally et al., 2004).

A large number of children and adolescents carry their pain into adulthood. Longitudinal studies have shown that 34% to 73% of children with chronic or recurrent pain still suffer from pain as adults (Lundeberg & Olsson, 2016). Bullying and pain complaints are frequent reasons for children and adolescents seeking school health care (Ellertsson, Garmy, & Clausson, 2017; Jonsson, Maltestam, Bengtsson Tops, & Garmy, 2017). Few studies have focused on the relationship between bullying and pain in children and adolescents, but the available evidence suggests that victims of bullying are more likely to experience pain (Fekkes, Pijpers, & Verloove-Vanhorick, 2004). Bullying victimization decreases physiological and psychosocial functioning, in part by inflicting or increasing pain. Understanding this relationship is important for efforts to create a healthy school environment and promote quality of life in childhood and adolescence; reducing physical pain by creating a positive school climate may be a novel idea, but this novelty does not diminish the importance of further strengthening arguments for the need of a zero-tolerance policy to bullying in schools.

Aim

This study sought to examine the relationships between bullying victimization and the most common types of recurrent pain (headache, stomach pain, backache, and neck/shoulder pain) among school-aged children.

Methods

In this study, the Icelandic data set from the World Health Organization international research network Health Behaviour in School-aged Children (Inchley

et al., 2016) was used. The regulations and requirements concerning human subject research, as laid out by the Data Protection Authority in Iceland (Personuvernd, 2013), were followed. Methodological details are described elsewhere (Garmy et al., 2019).

Sample

A total of 161 schools with 10,626 students participated in the study. The response rate was 84%. Females made up 50% of respondents; 32.1% were 6th graders (11 years old), 34.9% were 8th graders (13 years old), and 33.0% were 10th graders (15 years old). The questionnaire was distributed by teachers during a school lesson.

Measures

The question regarding bullying was preceded by the following explanation:

> We say a student is being bullied when another student, or a group of students, says or does nasty and unpleasant things against him or her. It is also bullying when a student is repeatedly teased in a way that he or she does not like, or when he or she is deliberately left out of things. But it is not bullying when two students of about the same strength or power argue or fight. It is also not bullying when a student is teased in a friendly and playful way.

In this study, the following question regarding bullying was included: "How often have you been bullied in school during the last months?" with five response options, ranging from *never* to *several times* per week. In this study, bullied was defined as being bullied at least 2 to 3 times monthly.

The students were asked how often they had experienced the following types of pain in the last 6 months: headache, stomachache, backache, and neck/shoulder pain. The response options for each pain ranged from about *every day* to *rarely* or *never*.

Analysis

Frequencies of bullying and pain were presented with descriptive statistics with percentages, means, and standard deviations. The χ^2 test and multiple logistic regression analysis were used to investigate associations between bullying and pain (Norman & Streiner, 2014). The level of significance was set at 5%. Statistical analysis was performed using IBM SPSS version 24.

Results

Headache was the most commonly reported type of pain. Among girls, headache was more common than backache, while most pains showed roughly the same prevalence in boys (Table 1). Headache was most common in Grade 6 (11 years old), while backache became successively more common with age (Table 2).

Students who had been bullied at least 2 to 3 times a month were more likely to experience headache, stomachache, back pain, and neck/shoulder pain compared with their nonbullied peers (Tables 1 and 2). Almost 8 in 10 bullied students (79.3%) experienced weekly symptoms of pain, compared with slightly more than half of nonbullied student (56.7%). Girls reported pain more often than boys (Table 1) and older age was also associated with more weekly pain (Table 2).

The multiple logistic regression analysis showed that older students and girls more often experienced weekly pain than younger students and boys. Furthermore, in addition to age and gender, bullying victimization at least 2 to 3 times month was associated with a threefold increase in the likelihood of weekly pain (odds ratio = 3.1; confidence interval [2.5, 3.9]; Table 3). There was a dose–response relation between the frequency of bullying and pain, meaning that the more frequently bullying occurred (five response options ranging from *never* to *several times* per week) the risk of experiencing pain increased. Furthermore, being bullied at least 2 to 3 times a month increased the risk of experiencing weekly

Table 1. Prevalence of Pain Among Bullied[a] and Nonbullied Boys and Girls ($n = 10{,}626$).

	Total			Girls			Boys		
	Not bullied ($n = 10{,}041$)	Bullied ($n = 585$)	p^a	Not bullied ($n = 4{,}914$)	Bullied ($n = 297$)	p^a	Not bullied ($n = 4{,}942$)	Bullied ($n = 270$)	p^b
Symptoms (weekly)									
Headache (%)	32.5	57.9	<.0001	38.4	67.0	<.0001	26.5	48.9	<.0001
Stomach ache (%)	27.8	54.2	<.0001	33.3	58.9	<.0001	22.2	49.3	<.0001
Backache (%)	27.7	47.4	<.0001	31.0	51.9	<.0001	24.3	41.9	<.0001
Neck/shoulder pain (%)	27.5	53.3	<.0001	32.2	59.3	<.0001	22.7	47.0	<.0001
Any pain[c]	56.6	79.3	<.0001	62.9	84.5	<.0001	50.2	73.3	<.0001

[a]Bullied was defined as being bullied at least 2 to 3 times monthly.
[b]χ^2 value.
[c]Any pain (i.e. headache, stomachache, backache, and neck/shoulder pain) over a 1-week span.

Table 2. Prevalence of Pain Among Bullied[a] and Nonbullied Students Aged 11, 13, and 15 Years ($n = 10,626$)

	Students in Grade 6 (age: 11 years)			Students in Grade 8 (age: 13 years)			Students in Grade 10 (age: 15 years)		
	Not bullied ($n = 3,072$)	Bullied ($n = 232$)	p[a]	Not bullied ($n = 3,448$)	Bullied ($n = 201$)	p[a]	Not bullied ($n = 3,254$)	Bullied ($n = 127$)	p[b]
Symptoms (weekly)									
Headache (%)	28.5	53.0	<.0001	33.4	60.7	<.0001	35.1	65.4	<.0001
Stomach ache (%)	26.7	52.6	<.0001	27.8	56.7	<.0001	28.8	54.3	<.0001
Backache (%)	18.5	37.1	<.0001	28.5	52.7	<.0001	35.0	56.7	<.0001
Neck/shoulder pain (%)	22.5	50.0	<.0001	27.4	54.7	<.0001	32.0	58.3	<.0001
Any pain[c]	50.2	75.4	<.0001	57.9	82.6	<.0001	61.3	81.9	<.0001

[a]Bullied was defined as being bullied at least 2 to 3 times monthly.
[b]χ^2 value.
[c]Any pain (i.e., headache, stomachache, backache, and neck/shoulder pain) over a 1-week span.

Table 3. Logistic Regression Analysis of Weekly Pain in Schoolchildren by Bullying, Age, and Sex ($n = 10,626$).

	Weekly pain[a] ($n = 3,754$; 35.3%)	*OR*	95% CI for *OR*	*p*
Bullied[b], *n* (%)	464 (79.3)	3.13	[2.53, 3.87]	<.0001
Not bullied, *n* (%)	5,683 (56.6)			
Age				
Grade 6 (11 years), *n* (%)	1,718 (52.0)			
Grades 8 and 10 (13–15 years), *n* (%)	4,262 (60.6)	1.49	[1.37, 1.62]	<.0001
Sex				
Boy, *n* (%)	2,681 (51.4)			
Girl, *n* (%)	3,343 (64.2)	1.70	[1.57, 1.84]	<.0001

Note. Hosmer and Lemeshow goodness-of-fit test $p = .010$; Nagelkerke $R^2 = .048$. *OR* = odds ratio; CI: confidence interval.
[a]Weekly pain refers to self-reported pain (i.e., headache, stomachache, back pain, and neck/shoulder pain) occurring at least once per week.
[b]Bullied was defined as being a victim of bullying at least 2 to 3 times monthly.

pain in more than one region (e.g., having both headache and a stomachache).

Discussion

This study sought to examine whether weekly pain (headache, stomachache, back pain, and neck/shoulder pain) was associated with being victimized by bullying among Icelandic children. Our results show that bullied children and adolescents suffer more frequently from pain than their nonbullied counterparts, although the numbers and percentages also show rather high levels of pain among the latter. These results are in line with previous studies (Fekkes et al., 2004; Sansone, Watts, & Wiederman, 2014).

Headache was the most commonly reported pain, but backache became successively more common with age. This is an interesting finding because backache is a common reason for sick leave in young adults in the Nordic countries (Ørstavik et al., 2016). With respect to pain in the stomach, head, back, and neck/shoulders, girls suffered more than boys. Overall, there was roughly a 10% difference between the frequency of girls' and boys' self-reported pain, whether bullied or not. A recent Swedish study also found that pain was more commonly reported among adolescent girls than boys (Borgman, Ericsson, Clausson, & Garmy, 2018). This study also found an association between depressive symptoms and pain in adolescents (Borgman et al., 2018). Preventing pain is a crucial issue for school nurses. Pain, especially headache, is one of the most common reasons children and adolescents make an appointment with the school nurse (Ellertsson et al., 2017).

It is possible to prevent bullying. Antibullying programs, commonly used in Iceland, have been found to be cost-effective (Beckman & Svensson, 2015). Primary preventive efforts to reduce bullying should be directed at all students as well as at parents. To reduce bullying, multiple disciplines should be involved, including teachers, administration, and school health-care professionals (Vreeman & Carroll, 2007). The first step is to adopt a high-quality antibullying policy at the school district

level (Hatzenbuehler, Schwab-Reese, Ranapurwala, Hertz, & Ramirez, 2015), and the second step is to implement these policies in students' daily schedules within the school to produce the desired effects on student behavior (Gower, Cousin, & Borowsky, 2017).

Strengths and Limitations

The strengths of this study include a high response rate, a large representative national sample, and a standardized anonymous questionnaire that should reduce response bias with respect to social desirability in responding to sensitive items. The cross-sectional design is a limitation of our study as it precludes definite conclusions about causality. For example, pain is a result of many factors that might also be related to factors that trigger bullying, such as lack of physical coordination (Badia et al., 2014; Bejerot et al., 2013). Recent studies also show that gross motor skills and social skills are correlated, as they also share areas of activity in the cerebellum (Stoodley & Schmahmann, 2010). Although this study had a high response rate, it was not specifically designed to measure bullying and therefore lacked follow-up questions that would have deepened our understanding of potential mechanisms through which bullying and pain affect one another, as well as the direction(s) of the relationship. Finally, some students were absent from school or chose not to respond to questions regarding bullying; therefore, we do not know their opinions. The absence from school could affect the results because children who experience higher levels of bullying might refrain from attending school.

Conclusions

The high prevalence of pain and pain combinations in bullied children should be investigated further longitudinally to understand the complex context of pain development in connection with social, cognitive, and physical factors. In light of its high prevalence and known destructive effects, identifying bullying and pain in children must be prioritized as standard practice for all health professionals.

Implications for School Nursing Practice

Children and adolescents victimized from bullying suffer more pain in various body parts (headache, stomachache, back pain, and neck/shoulder pain) than their nonbullied peers; however, the prevalence of pain is also high among nonbullied students. Pain could result from many factors affecting the body when suffering from violence in bullying, such as injury, as well as subsequent long-term mental health concerns such as stress, ostracism, and depression. It is therefore important for school nurses to assess for pain when meeting with children and adolescents, especially those who have been bullied, as well as to inquire about their peer relationships. Pain is a lingering problem among too many children, and it needs to be identified in its context and dealt with. Bullying is preventable and can be done so at the school level, by working with mental health professionals promoting interventions at schools (Onnela, Vuokila-Oikkonen, Hurtig, & Ebeling, 2014) as well as establishing and implementing antibullying policies through partnership between teachers, school health professionals, and administration (Shackleton et al., 2016; Vreeman & Carroll, 2007).

Acknowledgments

The Health Behaviour in School-aged Children study in Iceland was directed by the University of Akureyri, Centre for Prevention Studies in Iceland. The authors thank the Centre for Prevention Studies for allowing access to the data analyzed in this study.

Authors' Contributions

P. G., E. H., R. V., and G. K. all participated in the data analysis. P. G. drafted the manuscript. All authors read, contributed to, and approved the final manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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