

Unexplained Gastrointestinal Symptoms After Abuse in a Prospective Study of Children at Risk for Abuse and Neglect

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ABSTRACT

PURPOSE Unexplained gastrointestinal symptoms are more common in adults who recall abuse as a child; however, data available on children are limited. The aim of this study was to investigate the association of childhood maltreatment and early development of gastrointestinal symptoms and whether this relation was mediated by psychological distress.

METHODS Data were obtained from the Longitudinal Studies of Child Abuse and Neglect, a consortium of 5 prospective studies of child maltreatment. The 845 children who were observed from the age of 4 through 12 years were the subjects of this study. Every 2 years information on gastrointestinal symptoms was obtained from parents, and maltreatment allegations were obtained from Child Protective Services (CPS). At the age of 12 years children reported gastrointestinal symptoms, life-time maltreatment, and psychological distress. Data were analyzed by logistic regression.

RESULTS Lifetime CPS allegations of sexual abuse were associated with abdominal pain at age 12 years (odds ratio [OR] = 1.75; 95% confidence interval [CI] = 1.1-2.47). Sexual abuse preceded or coincided with abdominal pain in 91% of cases. Youth recall of ever having been psychologically, physically, or sexually abused was significantly associated with both abdominal pain and nausea/vomiting (range, OR = 1.5 [95% CI, 1.1-2.0] to 2.1 [95% CI, 1.5-2.9]). When adjusting for psychological distress, most effects became insignificant except for the relation between physical abuse and nausea/vomiting (OR = 1.5; 95% CI, 1.1-2.2).

CONCLUSION Youth who have been maltreated are at increased risk for unexplained gastrointestinal symptoms, and this relation is partially mediated by psychological distress. These findings are relevant to the clinical care for children who complain of unexplained gastrointestinal symptoms.

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INTRODUCTION

In the United States 48 in 1,000 children are reported for possible maltreatment (abuse and neglect) to Child Protective Services (CPS) each year.¹ Maltreatment is confirmed in one-quarter of these cases after investigation.¹ This number likely constitutes only a small proportion of all maltreatment, because for every child that CPS identifies as abused or neglected, 3 to 40 cases go unreported.²⁻⁴ Childhood maltreatment has negative sequelae in terms of both psychological and physiologic health.⁵ By early adulthood about one-third of child maltreatment victims suffer from depression,⁶ and more than 20% suffer from posttraumatic stress disorder.⁷ The risk for attempted suicide and poor health is almost twice as high as in individuals who have not been maltreated.^{6,8}

One of the more extensively studied long-term health outcomes of child abuse is gastrointestinal symptoms in adulthood. Adult survivors of abuse

are twice as likely to suffer from disabling and chronic gastrointestinal symptoms as adults who have not been abused.⁹⁻¹⁵ One-half to two-thirds of patients in a tertiary care gastroenterology clinic reported a history of abuse.¹⁶⁻¹⁸ Sexually abused women, in particular, report a high incidence of unexplained gastrointestinal problems.^{15,19} In addition to abuse, neglect has been associated with increased physical symptoms among adults with abdominal pain.²⁰⁻²³ In light of these relationships, some experts have recommended that physicians ask about physical or sexual abuse when a patient complains of unexplained gastrointestinal symptoms.^{24,25}

Despite a growing awareness of the relationship between child abuse and neglect and gastrointestinal symptoms later in life, only 1 study has focused on the impact of abuse on gastrointestinal symptoms in children. A chart review study found that 26.4% of children who were medically evaluated after sexual abuse complained of unexplained abdominal pain in the 1 to 2 years after their visit compared with only 6.9% of children who were not abused.¹⁹ There is a need to study children who have suffered other types of maltreatment, such as physical abuse and neglect.

Maltreatment could affect gastrointestinal symptoms through several mechanisms, including increased emotional distress and the effects of injury on hypersensitivity of the visceral nervous system,²⁶⁻²⁸ although the latter is less likely, given that few children have physical injuries resulting from abuse.¹ Since distress is associated both with maltreatment⁵ and reporting of gastrointestinal symptoms,²⁹ it may mediate the relationship between them. Furthermore, both maltreatment and psychological distress are associated with increases in somatization (a tendency to experience and report unexplained somatic symptoms and to misattribute them to disease).³⁰⁻³²

The aim of this study was to investigate the association between maltreatment and unexplained gastrointestinal symptoms in youth. We hypothesized that a history of abuse or neglect (determined by CPS records and self-report) increases the risk for self- and parent-reported unexplained gastrointestinal symptoms in youth, and that psychosocial distress would partly mediate this relationship.

METHODS

Subjects

Data were drawn from the 1,354 children enrolled in the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) (described in the Supplemental

Appendix 1, available online at <http://annfam.org/cgi/content/full/8/2/134/DC1>). LONGSCAN is a multisite, longitudinal study examining the

antecedents and consequences of child maltreatment. Children studied were chosen so that they varied by levels of exposure to maltreatment or risk of maltreatment. Overall, the cohort had a high prevalence of abuse or neglect. At the time of data extraction, 954 youth had completed interviews at age 12 years, and data on gastrointestinal symptoms were available for 845. Youth who had missing data on gastrointestinal symptoms did not differ by sex, race, or CPS-recorded and self-reported maltreatment from the children who were included.

Measures

Gastrointestinal Symptoms

Data on gastrointestinal symptoms were derived from the Child Behavior Check List (CBCL) completed by caregivers at ages 4, 6, 8, and 12 years, and from the companion Youth Self-Report (YSR) completed by the children at age 12 years.³³ The CBCL and YSR assess a child's potential behavioral problems. Item 56 of the CBCL and YSR asks caregivers and youth, respectively, to identify physical problems without a known medical cause in the past 6 months and includes abdominal pain or cramps, nausea/feeling sick, and vomiting/throwing up. We combined the latter 2 symptoms into 1 category (nausea/vomiting) because of the low frequency for both nausea and vomiting and their frequent co-occurrence.

Discrepancies between youth and caregiver reports of gastrointestinal symptoms are to be expected, because parent-child concordance for unexplained gastrointestinal symptoms is usually fair to low.^{34,35} In the current study children reported 2 to 3 times more gastrointestinal symptoms than did their parents. Thus, we considered a child to be having a symptom if either the caregiver or the child reported the symptom.

Psychological Distress

The YSR, which was completed by youth aged 12 years, assesses emotional and behavioral problems.³³ The YSR, a widely used instrument with excellent psychometric properties, includes 8 problems scales. We used the anxious/depressed problem scale to assess psychological distress.

Maltreatment

CPS maltreatment narratives were coded using the Modified Maltreatment Classification System (MMCS).³⁶ The MMCS has codes for 5 different types of maltreatment: (1) emotional maltreatment; (2) lack of supervision; (3) failure to provide food, hygiene, clothing, shelter, or medical care; (4) sexual abuse; and (5) physical abuse. Youth were identified as being exposed or not exposed to each of these 5 types and coded as

maltreated if there was at least 1 abuse or neglect allegation. We chose to use all allegations, because previous studies have shown that substantiated and unsubstantiated reports result in equivalent developmental outcomes and indicate similar home distress.³⁷⁻³⁹

In addition, at age 12 years, self-report of lifetime (birth to 12 years) abuse was assessed through an Audio-Computer Assisted Self-Interview with 3 instruments developed for the LONGSCAN project.⁴⁰ The Self Report of Physical Abuse and Assault assessed physical abuse, ranging from being kicked or punched to such offenses as being stabbed or shot by an adult. The Self Report of Sexual Abuse and Assault assessed increasingly severe sexual experiences, including no-contact experiences (eg, someone making you look at something sexual, such as a picture), fondling, oral-genital contact, and penetration. The Psychological Abuse Scale assessed experience with a range of caregiver behaviors that may be considered psychologically abusive, ranging from being called names "that made you feel really bad about yourself" to "a caregiver threatening to abandon you." Data were combined to yield a lifetime score (ie, occurred vs not occurred) for each of these 3 types of abuse.

Data Analyses

All data were analyzed with SPSS version 15.0 (Statistical Package for the Social Sciences, SPSS Inc, Chicago, Illinois). First we examined the bivariate relationship between lifetime maltreatment status and potential confounding variables (eg, sex and site of recruitment), unexplained gastrointestinal complaints, and psychological distress. Logistic regression was used to examine the relationship between each reported type of maltreatment and any gastrointestinal complaint while controlling for sex and site of recruitment. In addition, the mediating effect of psychological distress was tested according to the 4 steps outlined by Baron and Kenny.⁴¹ Step 1 is to examine whether maltreatment was associated with increased gastrointestinal symptoms, step 2 determines whether maltreatment is correlated with anxiety/depression, step 3 aims to show that anxiety/depression is related to gastrointestinal symptoms, and step 4 investigates whether the effect of maltreatment on gastrointestinal symptoms is suppressed when controlling

for anxiety/depression. We ran the above analyses separately for CPS data and self-reported maltreatment.

To test whether maltreatment preceded or came after gastrointestinal symptoms, the age period (0 to 4 years, 4 to 6 years, 6 to 8 years, 8 to 12 years) at which a caregiver reported gastrointestinal symptoms of the child for the first time was compared with the age period when the first CPS maltreatment allegation occurred. A nonparametric sign test was performed to test the sign of the relationship between these 2 variables.⁴²

RESULTS

Comparison of Children Maltreated and Not Maltreated

As can be seen from Table 1, maltreated youth were more likely to experience unexplained gastrointestinal symptoms and psychological distress. Significant differences by sex were found for type of maltreatment and gastrointestinal symptoms. Girls were less likely to be reported for physical abuse (30% vs 36% of boys, $P < .001$), but more likely to be reported for sexual abuse (20% vs 10% of boys, $P < .001$). Girls self-reported more psychological maltreatment (44% vs 37% of boys, $P < .05$) and suffered more abdominal pain (30% vs 15% of boys, $P < .001$).

Longitudinal Maltreatment Allegations Based on CPS Reports and Gastrointestinal Symptoms

Logistic regression analysis yielded significant associations between abdominal pain and CPS-recorded sexual abuse but not with the other types of maltreatment (Table 2). The proportion with abdominal pain in the group that was not maltreated was 520 of 1,000

Table 1. Demographics and Study-Related Variables in Children: Maltreated vs Not Maltreated and Abused vs Not Abused

Variable	CPS-Reported Maltreatment			Child Self-Reported Abuse		
	Maltreated (n = 559)	Not Maltreated (n = 286)	P Value	Abused (n = 402)	Not Abused (n = 425)	P Value
Sex, male, %	49.4	48.6	NS	45.8	51.3	NS
Race, %			<.001			NS
White	31.1	17.5		27.1	25.2	
African American	45.8	73.1		54.2	56.7	
Other	23.1	9.4		18.7	18.1	
Age, years	12	12	NS	12	12	NS
Nausea/vomiting, %	47.6	43.5	NS	53.4	38.0	<.001
Abdominal pain, %	59.3	52.1	.04	63.1	51.1	<.001
Psychological distress, mean (SD) ^a	4.8 (4.7)	3.7 (3.7)	<.001	5.7 (4.8)	3.1 (3.4)	<.001

CPS = Child Protective Services; NS = not significant.

^a On a scale ranging from 0 to 30.

compared with 672 of 1,000 for youth who experienced sexual abuse. Nausea/vomiting was not significantly associated with maltreatment. To determine the sensitivity of this analysis, we removed from the sample those who reported gastrointestinal symptoms before abuse. This step did not change the association between sexual abuse and abdominal pain (data not shown).

Taking advantage of the longitudinal nature of the data, we examined whether sexual abuse preceded unexplained gastrointestinal symptoms. Among those who were sexually abused, abdominal pain was reported before sexual abuse (8.8%), at the same time (46%), or at a later age (45.2%) than abuse allegations. Sexual abuse preceded or coincided with abdominal pain significantly more often than after it ($z = 14.4$; $P < .001$).

The results of the 4-step mediation analyses were as follows: sexual abuse predicts abdominal pain (step 1, as described above) and anxiety/depression ($\beta = 0.08$, $t = 2.2$; $P < .05$; step 2). Anxiety/depression was associated with unexplained abdominal pain (OR = 1.1; 95% CI, 1.1-1.2; step 3); and when it was included in the overall model, sexual abuse was no longer significantly related to abdominal pain complaints (OR = 1.4; 95% CI, 0.9-2.2; step 4).

Retrospective Self-Report of Abuse and Gastrointestinal Symptoms

Because a large proportion of abuse is generally not reported to CPS, we reran the above analyses with self-report of abuse at age 12 years. As shown in Table 3, self-reported recall of each type of abuse (psychological, physical, sexual) was significantly related to gastrointestinal symptoms. To test whether the effect of abuse is mediated by psychological distress, we again followed the 4 steps identified by Baron and Kenny.⁴⁰ Abuse predicts abdominal pain and nausea/vomiting (step 1, Table 3). Psychological ($\beta = 0.20$, $t = 5.5$; $P < .001$), physical ($\beta = 0.12$, $t = 3.5$; $P < .001$), and sexual abuse ($\beta = 0.15$, $t = 4.4$; $P < .001$) predicted anxiety/depression (step 2). Anxiety/depression was associated with unexplained abdominal pain (OR = 1.1; 95% CI, 1.1-1.2; step 3), and when it was included in the overall

Table 2. Logistic Regression Analyses of the Association Between Child Protective Services Maltreatment Allegations and Gastrointestinal Symptoms, Controlling for Data Collection Site and Sex

Variable	Abdominal Pain		Nausea/Vomiting	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Sexual abuse	1.5	1.1-2.4	1.3	0.8-1.9
Physical abuse	0.7	0.5-1.0	1.3	0.9-1.9
Emotional abuse	1.0	0.7-1.4	0.8	0.5-1.1
Lack of supervision	1.2	0.0-1.7	1.1	0.8-1.5
Failure to provide	1.1	0.8-1.6	1.3	0.9-1.9

CI = confidence interval.

Table 3. Odds Ratios for Self-Reported Abuse and Gastrointestinal Symptoms After Controlling for Data Collection Site and Sex

Self-Reported Abuse	Abdominal Pain		Nausea/Vomiting	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Psychological maltreatment	1.5	1.1-2.0	1.7	1.3-2.3
Physical abuse	1.7	1.2-2.4	2.1	1.5-2.9
Sexual abuse/assault	1.8	1.2-2.6	1.7	1.2-2.5

CI = confidence interval; OR = odds ratio.

model, only physical abuse significantly predicted nausea/vomiting (OR = 1.5; 95% CI, 1.1-2.2; step 4).

DISCUSSION

This study observed an association between early childhood maltreatment and preadolescent gastrointestinal problems. Unexplained abdominal pain was associated with both prospectively collected CPS records and retrospective recall of lifetime sexual abuse. In addition, the data show that sexual abuse usually preceded or coincided with abdominal pain, suggesting that pain may be a consequence of childhood abuse. Self-reports of all types of abuse (sexual, psychological, and physical) were associated with increased abdominal pain and nausea/vomiting. This finding may mean that any type of abuse can possibly increase the risk of having unexplained gastrointestinal problems. The above-discussed associations were found independently of sex, which is similar to findings in the adult population,⁴³ and suggests that both boys and girls who are maltreated are at risk for developing unexplained gastrointestinal symptoms.

Psychological distress mediated the association between both CPS-recorded or self-reported abuse and gastrointestinal symptoms. This finding coincides with the literature showing increased psychological distress and dysregulation in the hypothalamic-pituitary-adrenal axis among those who are abused as a child.^{25,44,45} Psychological distress, however, only partially medi-

ated the relation between physical abuse and nausea/vomiting, so other factors must play a role as well. Physical abuse may lead to abdominal injury, which has been associated with increased risk of unexplained gastrointestinal symptoms,^{46,47} possibly through long-lasting changes in nociception. Ringel and colleagues observed increased pain to gut distention and associated changes in central pain processing in adult patients with unexplained abdominal pain who have been abused compared with those who have not.⁴⁸

There can be many reasons why only sexual abuse, but no other types of CPS-recorded maltreatment, showed a relation with gastrointestinal symptoms. The most likely reason is that many children who have been maltreated are not reported to CPS.² When CPS data are used to classify children as maltreated, many who have actually been maltreated will be misclassified, which would weaken the estimated association of maltreatment with gastrointestinal symptoms. There is evidence that sexual abuse may be a more potent contributor to poor health status than other types of abuse, explaining why this association remained significant, and that this outcome is possibly due to increased psychological distress in the sexually abused.²⁵ The self-report data may be more accurate, although it can be plagued by recall bias. Youth may not remember being abused as an infant or toddler or may forget because they do not perceive it to have had a huge impact on their lives. Clearly, more studies are needed to address whether sexual abuse alone or all types of maltreatment are associated with increased complaints of unexplained symptoms.

This study has several limitations. First, data on gastrointestinal symptoms were collected by youth self-report and parent report and distilled from a larger questionnaire. We do not know the validity of these questions when used separately. The youth studied may have had an uninvestigated organic cause for their symptoms, although such a cause would be expected to be less than 5% to 10% of the sample.⁴⁹ Second, even though this prospective study of child maltreatment is the longest and most comprehensive to date, the sample was selected to include many children at high-risk for maltreatment in early childhood; the results are not directly generalizable to the general population. Only 11 of 1,000 children have been sexually maltreated in the community² compared with about 15% in our sample. In addition, rates of gastrointestinal symptoms were higher in our study, with about 46% complaining of nausea (vs 30% in community samples) and 56% of abdominal pain (vs 45% in the community).⁵⁰ It is possible that children who were not abused in this sample were more likely than the general population to be living in adverse, stressful circumstances (eg, poverty,

born to single parents, severe health issues). The contribution of other stressful factors, besides abuse, was not analyzed in the current study. Considering that abused children were compared with children who were not abused and who were dealing with many stressors in their lives, the association between gastrointestinal symptoms and abuse is probably reduced in this study. Community studies are needed to confirm these findings.

Even if the incidence of abuse and gastrointestinal symptoms are lower in primary care, finding that abuse recognition can modify the course of gastrointestinal symptoms would be important. To date only 1 case study described the positive effects of addressing abuse issues in the treatment of gastrointestinal symptoms⁵¹; thus, more studies are needed before we can draw any conclusions. Although diagnosis and treatment recommendations for children and youth who complain of abdominal pain and nausea can be found in recent reviews,⁵²⁻⁵⁴ treatment recommendations for abused patients with gastrointestinal symptoms are available for adults but not for youth.^{25,26}

Unexplained gastrointestinal symptoms in at-risk youth may be psychosomatic and should prompt consideration of possible psychosocial contributors, particularly maltreatment. It may be essential for the safety of the youth and important for successful treatment to identify child maltreatment victims complaining of unexplained abdominal symptoms. More studies are needed to inform early medical interventions, especially studies focused on how unexplained gastrointestinal symptoms can develop as a consequence of childhood abuse and neglect.

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