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Anxiety Mediates the Relation Between Childhood Sexual Abuse and Genito-Pelvic Pain in Adolescent Girls

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Previous research has demonstrated associations between child sexual abuse, anxiety, and genito-pelvic pain, but no study to date has examined whether sexual abuse may be associated with genito-pelvic pain through victims' elevated anxiety. The present study aimed to determine whether anxiety mediates the relationship between child sexual abuse and genito-pelvic pain. Using self-report questionnaires, data were gathered from 218 sexually active adolescent girls recruited from seven metropolitan high schools. As expected, results revealed a significant indirect effect of sexual abuse on the development of genito-pelvic pain through trait anxiety. This study thus suggests that anxiety may be one of the mechanisms by which child sexual abuse leads to an increased risk of developing genito-pelvic pain in this population.

INTRODUCTION

Genito-pelvic pain/penetration disorder (GPPD) is a common complaint among women and is characterized by pain experienced during sexual intercourse (American Psychiatric Association, 2013). With a prevalence of 8% to 12% in community samples of adult women (Harlow et al., 2014), it appears even more frequent in sexually active adolescents, where 20% of girls report genito-pelvic pain during intercourse lasting more than 6 months (Landry & Bergeron, 2009). Despite this high prevalence, relatively little attention has been paid to adolescents who experience this distressing sexual health problem.

Controlled studies show that genito-pelvic pain has multiple sexual, psychological, and relational consequences (Bergeron, Likes, & Steben, 2014). Affected women report more anxious and depressive symptoms, sexual dysfunctions, sexual distress, and lower sexual satisfaction (Bachmann et al., 2006; Gates & Galask, 2001; Nylanderlundqvist & Bergdahl, 2003; Reed, Advincola, Fonde, Gorenflo, & Haefner, 2003). Unfortunately, genito-pelvic pain is often not adequately addressed by the health-care system (Harlow et al., 2014; Nguyen, Ecklund, MacLehose, Veasley, & Harlow, 2012; Nguyen, Turner, Rydell, MacLehose, & Harlow, 2013). Epidemiological study results show that only 57% of women with genito-pelvic pain seek treatment and that, of these, only 48% obtain a proper diagnosis (Harlow et al., 2014). This is worrisome because

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with time and without adequate diagnosis and treatment, pain can be exacerbated and become harder to treat (Mandal et al., 2010). Adolescents may be even more at risk of being under the radar of health professionals, as genito-pelvic pain remains underinvestigated in this population (Bergeron, Corsini-Munt, Aerts, Rancourt, & Rosen, 2015) and they may be less likely to discuss their sex life with a physician (Alexander et al., 2014; Alexander et al., 2015). Since adolescence represents the beginning of sexual activity for a majority of individuals (Rotermann, 2012), focusing on this population could improve our understanding of how the pain develops and becomes chronic, and eventually lead to earlier detection and treatment of genito-pelvic pain.

Although the etiology of genito-pelvic pain is multifactorial, including biomedical and psychosocial factors, one important antecedent for its development is childhood sexual abuse (CSA). Two rigorous population-based studies have shown that adult women who experienced severe sexual abuse as a child were between 6.5 to 9.3 times more likely to report pain during intercourse (Harlow & Stewart, 2005; Khandker, Brady, Stewart, & Harlow, 2014). Furthermore, results of a meta-analysis that included 122 studies of factors predisposing women to chronic and recurrent pelvic pain revealed that those suffering from dyspareunia (painful intercourse) were almost three times more likely to report lifetime sexual abuse than those who did not (Latthe, Mignini, Gray, Hills, & Khan, 2006). These studies were conducted among adult women, who are subject to recall bias when asked retrospectively about the beginning of their genito-pelvic pain and about childhood sexual abuse. Also, studying adult women for whom pain has been present for years may limit the distinction between factors related to the onset of pain and factors related to its maintenance.

Although the association between CSA and genito-pelvic pain is robust, it remains misunderstood. Many biopsychosocial mediating mechanisms could explain how victims would be more at risk of developing genito-pelvic pain. Some factors hypothesized to play a role are a dysregulation of the stress mechanism leading to proinflammatory responses, a greater tendency to engage in high-risk sexual behaviors (e.g., unprotected sexual intercourse), and emotional pathways such as anxiety and depression (Fergusson, Horwood, & Lynskey, 1997; Finestone, Alfeeli, & Fisher, 2008; Heim, Ehler, Hanker, & Hellhammer, 1998; Kendall-Tackett, 2002). Among the psychosocial consequences of child sexual abuse, anxiety could be one of the factors explaining how victims would be at higher risk of developing genito-pelvic pain since it has been associated with CSA (Afifi et al., 2014; Fergusson, McLeod, & Horwood, 2013; Hillberg, Hamilton-Giachritsis, & Dixon, 2011) and genito-pelvic pain (Gates & Galask, 2001; Khandker et al., 2011; Nylanderlundqvist & Bergdahl, 2003).

Indeed, a robust cohort study revealed that up to 40.6% of the 16- to 18-year-old victims of sexual abuse presented anxiety disorders, which is more than three times the rate found in adolescents not reporting CSA (Fergusson, Boden, & Horwood, 2008). In addition, anxiety has also been identified as a risk factor for the development of genito-pelvic pain in both adolescent girls and women (Khandker et al., 2011; Landry & Bergeron, 2011). In a recent epidemiological study, the odds of genito-pelvic pain were four times higher among women with anxiety disorder antecedents, compared to women without (Khandker et al., 2011). Anxiety could predispose women to be more hypervigilant to pain cues and to catastrophize more—two factors associated with higher levels of pain during intercourse (Desrochers, Bergeron, Khalifé, Dupuis, & Jodoin, 2009). Also, anxiety has been associated with less physiological sexual arousal, which could put women at risk—in particular adolescents with less sexual experience—of developing repeated experiences of pain during intercourse because of a lack of lubrication (Payne et al., 2007).

In summary, many risk factors have been identified for the development of genito-pelvic pain, but we do not yet understand their underlying mechanisms. Although previous research has demonstrated associations between child sexual abuse, anxiety, and genito-pelvic pain, no study to date has examined whether sexual abuse may be associated with genito-pelvic pain through victims' tendency to be generally more anxious. Furthermore, the wide majority of studies have asked adult women to recall retrospectively their early pain and sexual experiences (Danielsson, Sjöberg, Stenlund, & Wikman, 2003; Harlow et al., 2014; Harlow & Stewart, 2005; Khandker et al., 2011), creating a possible recall bias, hence, it is important to investigate genito-pelvic pain directly among adolescent girls. Lastly, adolescence is the developmental stage when first intercourse usually occurs, therefore, it can allow a better understanding of onset factors (rather than maintenance factors) since pain is studied closer to its beginning.

Aims

The present study aimed to determine whether anxiety mediates the relationship between child sexual abuse and genito-pelvic pain among adolescent girls from a community sample. We hypothesized that adolescents with a sexual abuse history would report higher levels of anxiety, relative to the nonsexually abused adolescents, which in turn, would be associated with an increased risk of reporting genito-pelvic pain. Thus, the higher levels of anxiety in CSA victims would partially explain why they are more at risk of suffering from genito-pelvic pain.

METHOD

Participants

The following method has been described in two previous publications regarding the prevalence, characteristics, and biopsychosocial factors associated with dyspareunia (i.e., genito-pelvic pain) in adolescent girls (Landry & Bergeron, 2009, 2011). The cohort was made up of adolescent girls between 12 and 19 years of age who were recruited from seven high schools in a large metropolitan area. Recruitment was conducted in two distinct phases: school recruitment and participant recruitment within selected schools. The main goal of these two phases was to obtain a representative sample of adolescent girls. Therefore, schools having different socioeconomic backgrounds as well as Caucasian and multicultural populations were selected. However, given the challenges involved in recruiting schools in this area because of oversolicitation for research purposes, they were also chosen based on their interest to participate in the study. Hence, of the 12 schools initially solicited, seven agreed to take part in the study. Five of the seven participating schools were public with multiethnic student populations, while the two other schools were private with mostly Caucasian students. This provided an initial population of approximately 5,500 adolescent girls from which to sample. Two to four classes from every grade were selected by the schools' administration to take part in the participant recruitment sessions (i.e., approximately 2,025 girls).

Following the recruitment sessions, 1,439 girls agreed to complete the questionnaires, resulting in a participation rate of 71%. Fourteen participants were excluded from the analyses due to missing data, resulting in a final sample of 1,425 adolescent girls. Echoing norms found in representative North American samples, 25.5% of adolescent girls were sexually active with the mean age of first intercourse being 14.6 years old (Frappier et al., 2008). Selection criteria for

the current study included reporting more than five intercourse experiences ($n = 251$). From this sexually active subsample, those experiencing painful intercourse for less than 6 months ($n = 33$) were excluded from the study, whereas the girls experiencing pain during intercourse for at least six months ($n = 51$) or no pain during intercourse ($n = 167$) were included for a total sample of 218 adolescent girls.

Procedures

Data collection took place during two separate periods: May through June 2005 and May through June 2006. Research team members explained the study in detail to adolescent girls who had been taken out of their classrooms (i.e., no boys were present). General gynecological/reproductive health was presented as the research subject instead of genito-pelvic pain, which could have encouraged more girls with this problem to participate. The research team members greatly emphasized that all girls were invited to participate regardless of their sexual/ pubertal status (i.e., being sexually active or not, having had their first menstruation or not, etc.). The study presentation was followed by distribution of the consent form. With the legal age of consent being 14 years old in the area where this research was conducted, only girls aged less than 14 years had to provide informed consent by a parent or legal guardian in order to participate in the study, while girls aged 14 years and over could consent on their own.

Testing took place approximately two weeks after the participant recruitment session. Groups of participants were taken out of their classrooms for about one hour to complete the study questionnaire. This questionnaire was handed out and explained by research team members who remained available during the entire testing period and afterwards to answer questions or offer help if participants felt any distress. Adolescents were also told that they could communicate with research team members at any time following participation in case of questions or distress. The present study includes a subset of the measures that were administered. All questions were completed anonymously. Following participation, girls received an information package concerning gynecological and sexual health, a reference list of useful health services, and a coupon for a chance to win a \$50, \$75, or \$100 gift certificate to a local shopping center. All procedures were reviewed and approved by the authors' university Institutional Review Board and by the Research Committee of the city's school district.

Measures

Demographics

Sociodemographic questions were included in the self-reported questionnaire designed specifically for the study. Adolescent girls reported on general demographics including age, grade level, cultural background, religion, mother tongue, and socioeconomic status.

Childhood Sexual Abuse

Sexual abuse was measured using the two following items derived and adapted from the Revised Conflict Tactics Scales (Straus, Hamby, Boney-McCoy, & Sugarman, 1996): (1) someone

has forced you to engage in sexual contact (touching or oral/anal/vaginal sex) when you did not want to, and (2) someone exposed their genitalia to you or forced you to show your genitalia when you did not want to. Adolescents were asked to specify their lifetime frequency of actual occurrence (none, 1–2 times, 3–5 times, or more than 5 times). If participants answered “1–2 times” or more to either of those two items, they were considered as sexually abused.

Genito-Pelvic Pain

Genito-pelvic pain was assessed by asking sexually active girls if they regularly (at least 75% of the time) experienced pain during intercourse. Following a positive answer, pain duration was reported, this duration being used to classify girls as having chronic painful intercourse when they experienced pain for 6 months or longer (Danielsson et al., 2003). Participants were categorized either as suffering from chronic painful intercourse (1) or not (0) (see also study selection criteria in the Participants section).

Trait Anxiety

Level of anxiety was measured with the State-Trait Anxiety Inventory-Form Y, which has excellent psychometric qualities (Spielberger, Gorsuch, Lushene, & Vagg, 1983). In the trait anxiety scale (20 items), participants indicated the intensity of their general feelings on a 1 (*almost never*) to 4 (*almost always*) Likert-type scale, with higher scores reflecting higher anxiety (total score range: 20–80). Cronbach’s alpha for this scale in the present sample was .90.

Analyses

All sociodemographic factors were examined as possible confounding factors with Pearson correlations. To test whether data were consistent with a mediation hypothesis (indirect effect of sexual abuse on genito-pelvic pain through anxiety), multiple ordinary least-squares (OLS) regressions were computed using model 4 from PROCESS (Hayes, 2013) with SPSS Statistics pack for Mac, version 23.0. Level of significance was set at $p < .05$ for all analyses. The indirect effect (i.e., mediation) was formally and directly tested using 10,000 resampling bias-corrected bootstrap confidence intervals (95% CI). They were considered statistically significant when 0 was excluded from the interval.

RESULTS

Sample Characteristics

Descriptive statistics for demographic and study variables appear in Table 1. The final sample of sexually active girls ($n = 218$) had a mean age of 16.2 years (median = 16; range = 13–19;

TABLE 1
Descriptive Statistics of Sample Demographics and Key Variables

<i>Variables</i>	<i>Adolescent Girls N = 218</i>
Age (years)	Mean = 16.19, <i>SD</i> = 1.05
<i>Grade level</i>	
1	2 (0.9%)
2	11 (5.1%)
3	28 (12.8%)
4	58 (26.6%)
5	119 (54.6%)
<i>Socioeconomic status</i>	
Below middle-class	12 (5.5%)
Middle-class	100 (45.9%)
Above middle-class	106 (48.6%)
<i>Culture</i>	
Canadian	144 (66.1%)
Other	74 (33.9%)
<i>Religion</i>	
Catholic	138 (63.3%)
Other	27 (12.4%)
None	53 (24.3%)
<i>Mother tongue</i>	
French	164 (75.2%)
Other	54 (24.8%)
<i>Presence of genito-pelvic pain</i>	
Yes	51 (23.4%)
No	167 (76.6%)
<i>History of sexual abuse</i>	
Yes	69 (31.7%)
No	149 (68.3%)
<i>Trait anxiety</i>	<i>M</i> = 44.39, <i>SD</i> = 11.19

Notes. Grade 1 corresponds to the lowest year of high school in Quebec and grade 5 to the highest year. In the United States, it would correspond to 7th grade and 11th grade, respectively. *M* = mean

SD = 1.1). Although the sample included girls from diverse sociodemographic backgrounds, the majority reported identifying as Canadian, with French as their mother tongue, being Catholic, and perceiving their familial socioeconomic status to be middle class or above middle class. Of these 218 girls, 69 reported a history of sexual abuse in their lifetime (31.7%) and 51 reported genito-pelvic pain (23.4%). The mean age of first intercourse for the whole sample of sexually active girls was 14.5 years old (*SD* = 1.3).

Pearson Correlation Analyses

Using a Bonferroni correction, significance levels were adjusted to compensate for multiple testing effects; the *p* value was set at .01 to reach significance (.05 level of significance divided by six tests). Results indicated that none of the sociodemographics variables (age, grade level, cultural

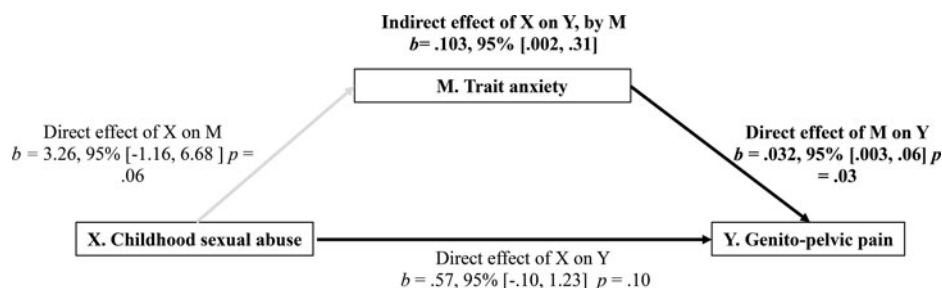


FIGURE 1 Results of mediation analysis testing the link between childhood sexual abuse and genito-pelvic pain through trait anxiety. The b represents regression coefficient. Confidence interval (95%) for direct and indirect effect were created by bootstrapping, with 10,000 resampling.

background, mother tongue, religion, or socioeconomic status) were associated with genito-pelvic pain. Therefore, no covariate was added to the mediational model.

Mediation Analyses

Figure 1 illustrates the results of the mediation analysis, which indicate that childhood sexual abuse was marginally linked to trait anxiety ($p = .06$). When adolescent girls reported being sexually abused, their score on the trait anxiety scale increased by 3.26 points, compared to their nonabused counterparts. Sexual abuse and trait anxiety were also significantly associated with genito-pelvic pain, indicating that a history of sexual abuse or a higher score on trait anxiety were both linked to the presence of genito-pelvic pain. The indirect effect of anxiety on the association between sexual abuse and genito-pelvic pain was significant, with a point estimate of .103 and a 95% bootstrap confidence interval of .002 to .31. Since the confidence interval does not include zero, this indicates that there is a significant indirect effect. Thus, adolescent girls who reported being sexually abused also reported higher levels of trait anxiety, which in turn, was associated with a higher risk of reporting genito-pelvic pain. The ratio of indirect to total effect of CSA on genito-pelvic pain indicates that trait anxiety carried 15.6% of the sexual abuse effect (Hayes, 2013).

DISCUSSION

This cross-sectional study aimed to determine whether trait anxiety mediated the relationship between a history of child sexual abuse and the development of genito-pelvic pain among a community sample of adolescent girls. As expected, results indicated a significant indirect effect of sexual abuse on the development of genito-pelvic pain through trait anxiety. Therefore, adolescent girls who reported being victims of sexual abuse reported being more anxious, which in turn increased their risk of reporting genito-pelvic pain. Prior studies also found a greater risk of developing genito-pelvic pain among women who reported being victims of sexual abuse in childhood (Harlow & Stewart, 2005; Khandker et al., 2014; Latthe et al., 2006) or who reported

higher levels of anxiety (Granot & Lavee, 2005; Khandker et al., 2011; Landry & Bergeron, 2011; Payne, Binik, Amsel, & Khalifé, 2005). The present study adds to this body of literature by, first, showing that anxiety is a significant pathway linking child sexual abuse and genito-pelvic pain and, second, to demonstrate that this link is already present in adolescence.

Many biological and psychological mechanisms could explain the links between sexual abuse, genito-pelvic pain, and anxiety. At the biological level, a growing number of studies suggest that stress mechanisms are involved in the relationship between childhood adversity and adult health (Miller, Chen, & Parker, 2011). More specifically, traumatic experiences, such as sexual abuse, represent important psychological stressors that could change innate and adaptive responses of the immune system via the influence of two important neuroendocrine systems: the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic-adrenal axis (de Carvalho Tofoli, Von Werne Baes, Martins, & Juruena, 2011; Hulme, 2011; Kemeny & Schedlowski, 2007). Those changes in the immune and neuroendocrine systems can lead to inflammation of the tissues, including the vaginal mucosa (Basson, 2012). Inflammation of the vulvar tissues is hypothesized to be involved in the development of genito-pelvic pain, as suggested by controlled studies comparing tissues of the vestibular mucosa of women with and without vulvovaginal pain (Bohm-Starke, 2001; Chadha et al., 1998; Falsetta et al., 2015; Tympanidis et al., 2004). Therefore, in girls who have been sexually abused, the potentially chronic stress and anxiety caused by this traumatic experience could lead to a dysregulation of their HPA and sympathetic-adrenal axis, which in turn can induce tissue inflammation at the vaginal entrance, explaining partly why victims may be more at risk of developing genito-pelvic pain.

Additionally, anxiety can have direct physical consequences during intercourse, which could lead to increasing pain intensity. First, anxiety in adolescent girls may inhibit their sexual arousal, which in turn may inhibit their lubrication, which could then lead to more pain upon penetration (Kalmbach & Pillai, 2014). However, this hypothesis is not well validated among adult women with genito-pelvic pain, even if controlled studies suggest decreased lubrication among this population compared to women without pain (Boyer, Pukall, & Chamberlain, 2013).

At the psychological level, anxiety could lead to an increased risk of developing genito-pelvic pain because of its behavioral and cognitive components. Women with more anxiety are more likely to interpret initial pain experiences negatively, which is, in turn, associated with an increased sensation of pain (Desrochers et al., 2009). Indeed, higher levels of pain catastrophizing (i.e., a pessimistic and exaggerated perspective on the pain and its consequences) and hypervigilance to pain (i.e., being very attentive to the slightest bodily discomfort) have been associated with higher levels of pain among women with genito-pelvic pain (Desrochers et al., 2009). Furthermore, anxiety can lead to more avoidance of intercourse and overall sexual exploration, which is a less adaptive coping strategy with deleterious consequences over the long term, including increased pain (Davis et al., 2015). Finally, it is important to mention that even if anxiety can lead to genito-pelvic pain, it is also one of its consequences (Khandker et al., 2011). Thus, a chain reaction, whereby anxiety leads to more pain and more pain leads to more anxiety, can take place and contribute to the maintenance of pain.

In line with previous studies, we also found an association between a history of sexual abuse and anxiety (Fergusson et al., 2008; Hillberg et al., 2011; Maniglio, 2009; McLaughlin et al., 2012), but this association was marginally significant. This unexpected result could partly be explained by the limits of the measurement of sexual abuse. Indeed, in this study, measurement of sexual abuse was dichotomous, categorizing participants into abused versus

nonabused groups, whereas some studies used a composite index evaluating the severity of abuse (Fergusson et al., 2008; Fergusson et al., 2013), which may give a more accurate picture of the abuse history but also allow a greater variance. A greater variance could have led to a stronger association between sexual abuse and anxiety since increasing severity of abuse (i.e., sexual abuse with noncontact vs. contact vs. attempted/completed penetration) has been related to increasing negative consequences such as anxiety (Fergusson et al., 2013; Yüce et al., 2015).

In a context where there are only a handful of published studies on genito-pelvic pain among adolescent girls, the present study proposed a pathway to better understand the etiology of this sexual health problem, while circumventing the biases of retrospective recall and sampling from clinical populations inherent to most studies involving adult women. Also, this study highlights the importance of considering the psychosocial components of genito-pelvic pain such as anxiety and sexual abuse.

Nevertheless, findings should be interpreted in light of the study limitations. First, this study used a two-item measure of sexual abuse, which could have led to underreported rates of sexual abuse. Indeed, it has been demonstrated that a larger number of questions about child sexual abuse concurred with higher prevalence rates, because more questions usually reflects a broader definition of CSA and will be more inclusive of different types of gestures (Stoltenborgh, van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011). However, in our initial community sample of 1,425 adolescent girls, the prevalence of sexual abuse was 21.3% (Landry & Bergeron, 2009), which is consistent with the adult literature in the field (Stoltenborgh et al., 2011), and therefore suggests that this measure seems adequate to assess a history of sexual abuse. In the current study, because we used a subsample consisting only of sexually active adolescents, the prevalence rate of sexual abuse was higher (31.7%) than that of the original sample. One hypothesis explaining this difference lies in the fact that sexually abused girls initiate sexual intercourse at a younger age (Senn, Carey, & Vanable, 2008), and sexually active adolescents may thus report a higher prevalence rate of sexual abuse than those from a larger community sample composed of sexually active and nonsexually active girls.

Secondly, the absence of a gynecological examination to confirm the diagnosis of pain is another limitation of our study. It is possible that the reported pain by adolescent girls was due to an infection (e.g., candida) rather than a chronic vulvovaginal pain condition. Although it is a possibility, infections usually bring women to visit a physician promptly, especially if symptoms (e.g., itching) are present all day. Moreover, pain during sexual intercourse is usually not the principal symptom of infections, and if that would be the case, it would be temporary, contrary to the chronic pain (more than six months) reported by the participants of this study.

Finally, we cannot make causal attributions between variables because of the cross-sectional design of the study. Longitudinal studies that could provide information on when sexual abuse occurred, the onset of pain, and potential changes in trait anxiety over time are required to know if the temporal sequence implicit to the mediational model is confirmed.

In spite of these limitations, results of the present study have substantial clinical applications. Health professionals must be aware that a history of sexual abuse among teenage girls can contribute to the development of genito-pelvic pain, a condition that can have a significant impact on their developing sexual life. Also, results suggest that victims of sexual abuse are more likely to experience higher anxiety levels, which could contribute to the emergence of genito-pelvic pain. Therefore, interventions specifically targeting anxiety could be an avenue to help these ado-

lescents cope with this sexual problem. Findings contribute to a better clinical understanding of genito-pelvic pain among adolescent girls by suggesting that anxiety is one mechanism by which sexual abuse increases the risk of pain.

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