Research Article

The Complex Relationship between Childhood Sexual Abuse and Chronic Pain

Hapidou EG[1,2]* and Posterski KJ[2]

[1]Michael G. DeGroote Pain Clinic, Hamilton Health Sciences, Department of Psychiatry and Behavioural Neurosciences, Bachelor of Health Sciences (Honor's) Program, McMaster University Medical Centre, Canada

[2]Department of Psychology, Neuroscience and Behaviour (PNB), McMaster University, Canada

*Corresponding author: Eleni G. Hapidou, Psychologist, Michael G. DeGroote Pain Clinic, Hamilton Health Sciences, McMaster University Medical Centre, 1200 Main Street West Hamilton, Ontario L8N 3Z5, Canada

Abstract

Background: Generally, the literature shows some relationship between childhood sexual abuse and chronic pain (CP). However, the evidence of this relationship is inconsistent.

Purpose: 1. To examine the incidence of childhood sexual abuse in individuals with CP assessed at an Interdisciplinary Chronic Pain Management Program (Michael G. DeGroote Pain Clinic, Hamilton, ON Canada); and 2. To investigate the relationship between childhood sexual abuse and CP by comparing scores on pain-related variables of individuals with a history of sexual abuse to those without.

Methods: Data were retrospectively analyzed from a database that includes pain-related measures and demographic information from questionnaires completed at initial psychological assessment at an interdisciplinary chronic pain management program. Data from 363 individuals were available for analysis. Two-way ANOVA (presence or absence of sexual abuse) X (male or female) were conducted to compare the psychometric scores across sexual abuse history and gender. Pain-related measures assessed depressed mood, anxiety, catastrophizing, Kinesiophobia, pain interference, pain intensity, stages of change, and acceptance of pain.

Results: The overall incidence of childhood sexual abuse among individuals initially assessed at the Michael G. DeGroote Pain Clinic was 16%; 10.7% of males and 20.1% of females. Those with a history of sexual abuse had higher scores on the Activities Engagement subscale of the Chronic Pain Acceptance Questionnaire (CPAQ) (p = 0.042), and on the Contemplation subscale of the Pain Stages of Change Questionnaire (PSOCQ) (p = 0.037). There were also gender differences in terms of the Pre-contemplation subscale of the PSOCQ (p = 0.054) with males obtaining higher scores.

Conclusion: The results suggest a relationship between sexual abuse and adaptation to CP as measured by the PSOCQ and CPAQ. Such findings have not been previously reported.

Keywords: Childhood sexual abuse; Chronic pain; Adaptation; Resiliency

Abbreviations

SA: Sexual Abuse; CP: Chronic Pain; PSOCQ: Pain Stages of Change Questionnaire; CPAQ-R: Chronic Pain Acceptance Questionnaire-Revised; HiREB: Hamilton integrated Research Ethics Board; PDI: Pain Disability Index; BPI: Brief Pain Inventory; PCS: Pain Catastrophizing Scale; PQ: Patient Questionnaire; TSK-11: Tampa Scale for Kinesiophobia-11; CAS: Clinical Anxiety Scale; CES-D: Center for Epidemiological Studies-Depressed Mood Scale

Introduction

Chronic Pain (CP)

Although acute pain serves a clear adaptive function, in some cases, pain persists past its adaptive value and may impair normal function [1]. Generally, pain persisting for at least three to six months is considered chronic, affecting approximately 19% of Canadian adults [1,2]. Since CP has a psychological component, psychological implications of childhood sexual abuse have been suggested to influence the CP experience.

The relationship between childhood sexual abuse & CP

A number of studies have investigated the relationship between childhood sexual abuse and CP. Incidence rates of sexual abuse have been reported from a number of CP populations, and variables assessing CP severity and functional impairment have been compared between individuals with and without a history of sexual abuse. However, previous findings are largely inconsistent and conflicting.

Reported incidence rates of childhood sexual abuse in CP populations are highly variable. For example, As-Sanie, et al. [3] reported a relatively high incidence (28.2%) of childhood sexual abuse in chronic pelvic pain patients, compared to its incidence in the general population (approximately 15%) [4]. This incidence was higher than child physical abuse (23.8%), and lower than the incidence of adolescent or adult physical and sexual abuse, which was 29.7% and 32.6%, respectively. In another study, although with a small sample size, when comparing chronic pelvic pain patients to chronic lower

back pain patients and pain-free controls, Lampe, et al. [5] found that 22% of patients with chronic pelvic pain were sexually abused before the age of 15. In comparison, chronic lower back pain patients and pain-free controls had significantly less incidence of childhood sexual abuse. Interestingly, both CP populations had equal incidence of physical abuse, and greater than that of the control group. The reportedly higher incidence of sexual abuse in CP samples suggests that individuals with sexual abuse may be more likely to experience a CP condition, or seek help for their CP condition. However, other studies did not find a high incidence of childhood sexual abuse in CP samples. With the use of control groups, Fishbain, et al. [6] found that among heterogeneous CP patients, 20.1% of females and 11.1% of males self-reported childhood sexual abuse. These values were not statistically different from either the community non-patients without pain, or community patients with pain. In another study using a control group, Lampe, et al. [7] compared women with chronic pelvic pain, chronic lower back pain, and pain-free controls. They found no difference in the incidence of childhood sexual abuse between the three groups; however, physical abuse was reported more frequent in both pain groups, compared to the pain-free controls.

Similarly to incidence rates, comparisons of scores on pain-related variables between individuals with and without a history of sexual abuse are unclear. This is largely due to the fact that studies vary in the measures used to assess pain intensity and functional impairment. However, some studies indicate that individuals with a history of sexual abuse have a worse pain experience. In a clinical study of fibromyalgia patients, generalized abuse was related to both impaired general function and quality of life [8]. Patients with fibromyalgia and abuse had a worse impact of fibromyalgia—including worse scores on subscales assessing physical function, work missed, job availability, pain, depression and anxiety. Individuals with a history of abuse also had worse scores on a number of measures assessing health-related quality of life, such as perception of health, social functioning, mental health, and vitality. However, these results are not indicative of a specific association between childhood sexual abuse and CP experience, but rather abuse in general and fibromyalgia specifically. In another study Finestone, et al. [9] found that of individuals attending a group therapy program, those with a sexual abuse history reported a higher number of painful body areas, and described their pain as more widespread. Also, women who were sexually abused reported CP—defined as pain persisting longer than three months—more frequently. In a U.S. cohort study, Brown, et al. [10] used both self-reports and officially documented reports of childhood maltreatment to investigate the relationship between childhood physical and sexual abuse, and adulthood CP—measured by pain frequency and pain impairment. After controlling for depression, they found a significant association between self-reported childhood sexual abuse and more frequent pain, but not pain impairment. In another study, Linton [11] used a prospective approach and found that sexual abuse may play a role in the development of CP. Linton [11] compared pain reports at the beginning and end of a one-year interval for both a group of individuals with back pain and controls. If individuals did not have back pain at the beginning of the year, then sexual and physical abuse was both associated with an increased risk of pain and functional problems at the end of the year. In contrast, for individuals with back pain at the beginning of the year, neither sexual nor physical abuse

history increased the risk of worsening pain or function at the end of the year. These results indicate that sexual abuse may have a role in CP onset, but not in the worsening of existing pain. Other studies suggest that patients with a history of sexual abuse do not experience worse pain. As-Sanie, et al. [4] investigated the relationship between a history of physical or sexual abuse, and pain severity, pain disability and depressive symptoms among women with chronic pelvic pain. Chronic pelvic pain patients with a history of abuse were divided into four groups: child physical abuse, child sexual abuse, adolescent/adult physical abuse, and adolescent/adult sexual abuse. After controlling for age and education, As-Sanie, et al. [4] did not find any abuse category to significantly predict higher pain severity. However, there was a significant association between a history of adolescent/adult sexual abuse and higher pain-related disability, and adolescent/adult physical and adolescent/adult sexual abuse were associated with higher levels of depression. In another clinical study, Fishbain, et al. [6] found that among heterogeneous CP patients a history of childhood sexual abuse did not predict variables such as depression, drug abuse/dependence, pain, anxiety, or somatization. As stated previously, this study utilized control groups—community non-patients without pain and community patients with pain.

The relationship between childhood sexual abuse and CP is further complicated by potential mediating factors such as PTSD, which is commonly observed in both individuals with childhood sexual abuse and CP [12,13]. For example, Powers, et al. [14] used a community and cross-sectional approach and found that both childhood abuse and PTSD symptoms predicted higher pain levels. However, PTSD fully mediated the effects of childhood abuse on pain severity. In contrast, Raphael & Widom [15] selected a cohort of individuals with court-documented childhood abuse or neglect, matched them with controls, and assessed pain complaints in middle adulthood. Their findings suggest that PTSD, at most, weakly mediates the relationship between childhood abuse and risk of pain in adulthood. Although they found a combined effect of childhood abuse and PTSD associated with increased risk of pain in adulthood, neither abuse nor PTSD alone predicted pain.

There are clearly inconsistent conclusions among previous studies investigating the relationship between childhood sexual abuse and CP. These studies vary in pain-related measures used to assess CP, heterogeneous or homogeneous CP samples, and the definition and specificity of childhood sexual abuse. Therefore, it is difficult to make direct comparisons between different studies and have a clear understanding of the relationship.

Scope of the present study

The present study clarifies and expands the current understanding of the relationship between childhood sexual abuse and CP. Data from patients assessed at an Interdisciplinary Chronic Pain Management Program (Michael G. DeGroote Pain Clinic, Hamilton, ON Canada) were retrospectively analyzed to investigate two research questions: Firstly, what is the incidence of sexual abuse in patients with CP assessed at the Interdisciplinary Chronic Pain Management Program? Secondly, what is the relationship between sexual abuse history and CP? To assess the second question, psychometric findings on pain-related variables were compared between individuals with and without a history of sexual abuse. Since this was an exploratory

study, the overall aim was to provide insight into the incidence and CP severity of patients assessed for interdisciplinary treatment. If individuals with a history of sexual abuse have worse scores on pain-related variables, therapeutic interventions targeting abuse sequela might be beneficial to the CP population.

Materials and Methods

Participants and procedures

The participants in the present study included all patients initially assessed in the Interdisciplinary Chronic Pain Management Program of the Michael G. DeGroote Pain Clinic between May 2013 and December 2015. These patients included individuals seeking help for their chronic pain condition, and were referred to the program by physicians, specialists, lawyers, Veteran's Affairs, Department of Defense or insurance company representatives. Although some of the individuals proceeded to complete the four-week interdisciplinary chronic pain management program, the present study exclusively used data collected at initial assessment. In total, 381 patients completed an initial assessment; however, after excluding patients with incomplete data on a question assessing history of sexual abuse, data from 363 individuals were included in the present study. We performed a complete case analysis from which less than 5% of the cases were missing. Due to this small number, we did not see it fit to include a method that handles missing data.

Data were not available due the fact that a) the assessors might have not obtained the information as to whether sexual abuse was present or not, and/or b) the patients did not want to respond to this question. In any case, the number of missing data was less than 5% and thus would not likely influence the results significantly.

Individuals were mailed questionnaires prior to the initial assessment, which they completed and brought to their clinical interview appointment. Childhood sexual abuse was defined as sexual interference occurring before the age of 15. Presence of sexual abuse was obtained from a particular section of the patient's psychological portion of the initial assessment interview. Demographic information, scores on pain-related questionnaires, and presence of sexual abuse, was obtained from a database for all participants. All study participants provided informed consent. Hamilton Integrated Research Ethics Board (HiREB) of Hamilton Health Sciences granted ethics approval for this study (project 0876C) on December 7th, 2015.

Measures

Data for this study were collected from the questionnaires mailed to patients before their initial assessment. Patients completed a demographic information questionnaire, and nine questionnaires measuring pain-related variables (see below).

a) Pain Disability Index: The Pain Disability Index (PDI) assesses the extent to which CP interferes with the individual's daily functioning [16,17]. Individuals circle the number that best reflects the level of disability from 0 (no disability) to 10 (total disability) experienced for each of the seven categories of life activities: family/home responsibilities, recreation, social activity, occupation, sexual behavior, self care, and life support activity [16]. The final score is calculated by summing all item scores with scores ranging from 0-70 [16]. The PDI has been shown to be a reliable measure, demonstrating high internal consistency (Cronbach α=0.86) [18] and high test re-test reliability (Intra-Class Correlation Coefficient (ICC)=0.91) in patients who repeated their questionnaire one week after its initial completion [19]. The construct validity of the PDI has also been established, as patients with higher PDI scores had significantly more pain characteristics including restriction of activities and psychological distress (all p<0.001) than patients with low PDI scores[18]. As well, the PDI has shown significant associations with other pain-related variables (e.g., depression, pain intensity, employment status) [20,21].

b) Brief Pain Inventory: On the pain intensity dimension of the Brief Pain Inventory (BPI), individuals rate their pain intensity in the previous 24 hours in terms of worst, least, average and current pain at the time of assessment on a scale of 0 (no pain) to 10 (pain as bad as you can imagine) [22]. The final score is obtained by calculating the average of the summed item scores. The pain intensity scale of the BPI has been supported as a valid and reliable measure for measuring pain intensity among CP patients. It has demonstrated acceptable internal consistency with a Cronbach α coefficient of 0.85, verifying the use of the scores as outcome variables in treatment outcome analyses. The responsiveness of the BPI is also established, as the scale scores showed significant (p<.05) improvements in detecting and reflecting improvement in pain intensity over time, compared to other related pain scales [22].

c) Pain Catastrophizing Scale: The Pain Catastrophizing Scale (PCS) measures negative thinking about pain [23]. The PCS is composed of 14 items that are rated on a scale from 0 (not at all) to 4 (all the time) [23]. The items describe various perceptions and feelings that individuals may have regarding their pain and pertain to one of three subscales: rumination, magnification, and helplessness [23]. Once the individual rates the degree to which they experience the listed thoughts and feelings, the item scores are summed and their final score is obtained. Total score ranges from 0 to 56 [23]. The PCS has demonstrated acceptable and satisfactory internal consistency for total score (α=.97) and its three subscales: rumination (α=.87), magnification (α=.60), and helplessness (α=.79) [23]. Convergent validity has also been demonstrated, as evidenced by the moderate correlation of total PCS scores with scores on negative affectivity (r=.75, p<00.1) and self-reported anxiety measures (r=.32, p<.001) [23]. Strong test-retest reliability has been established for six weeks (r=.75) and 10 weeks (r=.70) in a sample population [23]. Evidence for construct validity was demonstrated by confirmatory factor analysis, establishing that the scale measures a single construct (e.g. catastrophizing) described by three related dimensions (e.g., rumination, magnification, and helplessness) [24]. Osman, et al. [24] showed that the PCS demonstrates discriminate and criterion related-validity, as none of the examined demographic variables were significantly related to PCS total or subscale scores, and total PCS scores were useful in differentiating between criterion groups (t=4.99. p=<.001), respectively [24].

d) Patient Questionnaire of the PRIME-MD: The Patient Questionnaire of The Primary Care Evaluation of Mental Disorders (PRIME-MD PQ) functions as a preliminary symptom screen for mental disorders and measures the number of recent bothersome symptoms and overall health rating in the past month [25]. The Patient Questionnaire (PQ) instructs the individual to check off "yes"

or "no" for each item in a 25-symptom list. At the end of the PQ, the individual rates their overall health as "excellent," "very good," "good," "fair," or "poor." Their final score is calculated by summing the number of times the individual checked-off "yes," on the 25 items and the rating of their overall health is noted [25]. Total score ranges from 0 to 25. The validity of this scale has been established by comparing independent mental health professional diagnoses against diagnoses attained by the scores of the PRIME-MD [25]. From this, the scale has demonstrated excellent overall accuracy (88%) and good agreement (κ=0.71). As well, the PQ has been shown to be a useful tool in screening mental disorders demonstrating good to excellent sensitivity across all diagnoses including mood (69%), anxiety (94%), alcohol (81%) and eating (86%) disorders [25]. Specificity measures of the PQ are comparable for mood (82%), anxiety (53%), alcohol (91%) and eating (88%) disorders [25].

e) Pain Stages of Change Questionnaire: The Pain Stages of Change Questionnaire (PSOCQ) measures patient readiness to adopt a self-management approach to their CP condition [26]. The PSOCQ instructs the individual to rate how strongly they agree or disagree with statements using a scale from 1 (strongly disagree) to 5 (strongly agree) [27]. Each item loads on to one of four stages of change: pre-contemplation, contemplation, action or maintenance [27]. A) Pre-contemplation: Believing that the problem is mostly medical and that pain relief is left up to physicians. B) Contemplation: Willing but reluctant to adopt a self-management approach to CP problems. C) Action: Reflecting on the acceptance of a self-management approach and engageability in such treatment. D) Maintenance: Reflecting on an established self-management approach and intention to continue this approach [26]. The scores for each stage are averaged, resulting in four final scores that range between 1 and 5, with scores closer to and including 5 indicating a higher probability of the individual being at a particular stage(s) [27]. If the individual scores high on contemplation, action and/or maintenance subscales, they are more likely to benefit from treatment that involves self-management strategies [27]. Data analysis supports this four-factor scale, as this model fits the data without significant deviations (X^2(317) =333.68, p=>0.05) and demonstrated a goodness-of-fit index of 0.92 [26]. The PSOCQ has demonstrated excellent reliability in each subscale: pre-contemplation (α=.77), contemplation (α=.82), action (α=.86), and maintenance (α=.86) and excellent test-retest reliability (α=0.74-0.88 over a one to two-week period) [26]. Evidence for criterion-related validity has also been established, as measures of control, accommodation, and active coping were positively related to maintenance (r=.61, r=52, r=.49 respectively) and negatively related to pre-contemplation (r=−.55, r=−.37, r=−.35 respectively) [26]. The PSOCQ's validity is further supported by its association with treatment outcome [26,28] its usefulness in predicting commitment in self-management pain treatment, [27] and its relationships with other pain-related measures [29].

f) Chronic Pain Acceptance Questionnaire: The Chronic Pain Acceptance Questionnaire-Revised (CPAQ-R) measures CP acceptance [30]. The CPAQ-R instructs patients to rate the degree to which each statement applies to them using a scale from 0 (never true) to 6 (always true) [30]. The statements quantify one of two constructs of pain acceptance: activity engagement (11 items) or pain willingness (nine items) [30]. Item scores are sorted based on

the acceptance construct and are subsequently added, resulting in two subscale scores (0-66 and 0-54, respectively) and a total score (0-120, the sum of the two sub-scale scores) [30]. The CPAQ-R has demonstrated good internal consistency and Cronbach alpha values for each subscale: activity engagement (α=0.82) and pain willingness (α=0.78), providing evidence for its reliability for its use as a pain measure [30,31]. The CPAQ-R has also demonstrated adequate predictive validity, as outcomes like depression, pain-related anxiety, and psychosocial disability could be significantly predicted by both pain willingness (all p<0.05) and activity engagement (all p<0.05) subscales [31].

g) Tampa Scale for Kinesiophobia: The Tampa Scale for Kinesiophobia-11 (TSK-11) measures pain-related fear of movement. Individuals indicate how strongly they agree with 11 statements from a scale of 1 (strongly disagree) to 4 (strongly agree) corresponding to one of two categories: somatic focus (tendency to notice and report physical symptoms) or activity avoidance [32]. The final score (1-44) is obtained by summing the item scores [32]. The TSK-11's psychometric properties demonstrate good test-retest reliability (ICC=0.81, standard error of measurement (SEM)=2.54), internal consistency (α=0.79) and responsiveness (standardized response mean (SRM)=-1.11) [32,33]. Additionally, The TSK-11 has established concurrent (convergent) validity and predictive validity.

h) Clinical Anxiety Scale: The Clinical Anxiety Scale (CAS) measures clinical anxiety using a scale from 1 (rarely or none of the time) to 5 (most or all of the time) [34]. Individuals rate how often they have experienced each item in the 25-statement list [34]. Once the scores for items 1, 6-8, 13, 15, 16, and 17 are reversed (e.g., a score of 1 is reversed to a score of 5), the final score is calculated by summing up the individual scores and subtracting 25. Total score ranges from 1 to 100) [20,34]. The CAS has been shown to be a very reliable measure indicated by a high internal consistency (α=.94) and low standard error of measurement (SEM=4.2) [35]. As well, the CAS has demonstrated good known-groups discriminant validity (r=.77), effectively distinguishing between low-anxiety groups and clinical anxiety populations [35]. Moreover, it is significantly superior at discriminating these populations compared to other anxiety tools including the Rational Behavior Inventory, Generalized Contentment Scale, and Psycho-Social Screening Package (all p<0.002) [35].

i) Center for Epidemiological Studies-Depressed Mood Scale: The Center for Epidemiological Studies-Depressed Mood Scale (CES-D) measures depressive symptoms in non-psychiatric samples [36]. Using a scale from 0 (rarely or none of the time; less than 1 day) to 3 (most or all of the time; 5-7 days), individuals are instructed to rate how often they have experienced each symptom in the 20-item list during the past week [36]. Most items in the list are related to depressed mood, feelings of guilt, worthlessness and helplessness. Items 4, 8, 12 and 16, however, test positive affect and are reversed before calculating the individual's final score (e.g., a score of 0 is reversed to a score of 3) [36]. The final score (0-60) is calculated by summing up the individual item scores [36]. While a final score of 16 indicates depressed mood in the normal population, a score of 19 suggests depressed mood in the CP population, preventing significantly higher classification of depression [37,38]. The CES-D has demonstrated high internal consistency in both the general (α=0.85) and psychiatric populations (α=0.90), and can effectively

discriminate between these two groups [36]. Evaluated test-retest reliability of the CES-D has found moderate correlations (r=0.45- 0.7) between initial and follow-up scores three to 12 months after the initial questionnaire was given [36]. The CES-D's criterion validity has been shown, as its scores are positively correlated with other self-report scales that measure symptoms of depression (r=0.55- 0.74) and negatively correlated with scales measuring variables different from depression (r=-0.55); providing evidence for its convergent and discriminant validity, respectively [36]. The CES-D was found to be a valid measure of depressive symptoms in the general and CP populations. Moreover, it has shown good predictive validity in identifying depression in the CP population, and superior sensitivity in identifying differences in depression severity when compared to other depression scales (e.g., the Beck Depression Inventory (BDI)) [39,40].

Demographic information

The demographics questionnaire recorded age, gender, place of birth, years living in Canada, marital status, number of children, current or last known occupation, last month/year employed, years of education, pain duration, total number of injuries, number of times the individual has visited a family physician and/or specialist, and the number of times the individual has visited the emergency room. This was devised for use in the program.

Statistical analysis

The scores on the above measures and questionnaires were calculated using scoring guidelines transferred to a scoring summary sheet. Demographic information and scores on questionnaires assessing pain-related variables were entered into a Microsoft Excel spreadsheet, along with the patient's gender, age, and history of sexual abuse (yes or no). To investigate the incidence of childhood sexual abuse, the number of individuals with and without a history of sexual abuse was calculated (both overall and while accounting for gender). The percentage of individuals with sexual abuse was also determined. In the analyses investigating the relationship between sexual abuse and pain experience, the predictor or independent variables were gender and history of sexual abuse, and response or dependent variables included quantitative scores on demographic and psychometric measures.

All statistical testing was conducted using the statistical software package SPSS (Statistical Package for the Social Sciences). First, a univariate analysis was performed to determine the frequency distribution, and mean and standard deviation of categorical variables. T-tests and chi square tests were conducted in a bivariate analysis to determine if scores on categorical variables differed between individuals with and without a history of sexual abuse.

Next, scores on pain-related variables were utilized to investigate and the relationship between childhood sexual abuse and CP. First, individuals with a history of sexual abuse were paired with age and gender controls. This case-control approach was used to compare similar groups while avoiding confounding effects. Using these groups, paired samples t-tests were conducted to determine if there were any significant differences between individuals with and without a history of sexual abuse. A two-way MANOVA was also conducted to assess the main effect of the independent variables, sexual abuse (yes or no) and gender (male or female), on the pain-related variables,

and to determine if there was an interaction effect between the two independent variables on the continuous study variables collectively. The two-way MANOVA was performed to control for type I error, given the multiplicity of the response variables. Next, the entire sample was used to perform two-way ANOVA tests comparing males and females with a history of sexual abuse on these pain-related variables to the larger sample of individuals without a history of sexual abuse.

Individuals were excluded from an analysis if there were missing data on a measure. Possible reasons for missing data may include incomplete responses on a questionnaire or improper response to numerical questions (e.g., responding with "many" or "multiple" when reporting the number of doctor visits in the demographic questionnaire). In one case, an outlier on the CPAQ scale was identified and the independent samples t-tests and two-way ANOVA tests were conducted again excluding this outlier. Of the 381 individuals initially assessed, 363 had information for history of sexual abuse. Individuals without information for the sexual abuse measure were excluded from the statistical analyses. All remaining missing data were considered missing at random.

Results

Descriptive and frequency statistics

Data were obtained from 381 individuals initially assessed at the Michael G. DeGroote Pain Clinic between May 2013 and December 2015. On average, individuals from this population were 47 years old, have lived in Canada for 42 years, have been off work for 44 months, completed 14 years of education, had pain lasting for 74 months, and had sustained two injuries. They had also visited their family physician 67 times, the ER three times, and had seen six specialists since their pain began. These descriptive statistics of demographic variables are reported in (Table 1).

The majority of individuals in this sample did not have a history of sexual abuse (84%), were female (54.9%), born in Canada (71.9%), married or in a common-law relationship (58.4%), had children (75.5%), were not currently employed (65.2%), and had a motor vehicle accident (MVA) – related injury (76.8%). These frequency statistics are reported in (Table 2).

Incidence of sexual abuse

Of the 363 individuals for whom there were data for the presence of sexual abuse, 58 individuals reported experiencing sexual abuse before the age of 15, and 305 did not. Therefore, the overall incidence of sexual abuse history was 16%. With respect to gender, 10.7% of males and 20.1% of females reported a history of sexual abuse.

Independent T-Tests and Chi Square Tests on demographic variables

Independent t-tests showed that individuals with a history of sexual abuse lived in Canada for more years (p = .011). Chi-square tests showed a gender difference in that more females than males reported childhood sexual abuse (p = .015). There was also a significant difference in marital status between individuals with and without a history of sexual abuse (p = .005) in that more individuals with a history of childhood sexual abuse were married or in a common-law relationship, compared to being divorced, separated or widowed.

Table 1: Descriptive statistics of demographic and pain-related variables.

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Age	381	19	82	47.28	12.617
Time Lived in Canada (years)	360	3	77	41.64	14.619
Last Employed (months)	337	0	497	44.11	66.501
Education (years)	357	3	29	13.69	3.221
Pain Duration (months)	351	2	684	74.29	99.178
Total Number Of Injuries	343	0	20	2.29	2.23
Number of Doctor Visits	260	0	8567	67.45	531.744
Number Of Specialists	322	0	50	5.90	5.427
Number of ER visits	312	0	100	2.85	6.680
CES-D	373	1	60	32.07	12.838
PCS	373	0	56	31.65	13.364
CAS	371	0	96	39.85	20.466
PQ	374	1	23	13.11	3.900
PDI	370	6	70	46.53	11.960
TSK	371	11	44	31.51	6.895
CPAQ (AE)	366	0	66.0	24.093	11.9745
CPAQ (PW)	366	0	43.0	17.454	8.8250
CPAQ (Total)	366	3.0	98.0	41.456	17.3093
PSOCQ (Pre Contemplation)	366	1.0	5.0	2.977	.7000
PSOCQ (Contemplation)	366	1.0	5.0	3.731	.6223
PSOCQ (Action)	366	1.0	5.0	3.017	.8008
PSOCQ (Maintenance)	366	1.0	5.0	3.107	.8200

Analysis of pain-related variables

Pain-related variables analyzed included measures assessing depressed mood (CES-D), anxiety (CAS), catastrophizing (PCS), Kinesiophobia (TSK), pain interference (PDI), pain intensity (BPI), stages of change (PSOCQ), and acceptance of pain (CPAQ). As mentioned previously, a two-way MANOVA and paired samples t-tests were conducted using a matched-pairs approach. Neither test yielded any significant results ($p > 0.05$). Next, two-way ANOVAs were performed to assess the effect of the independent variables, sexual abuse (yes or no) and gender (male or female), on the pain-related variables. The alpha level for all comparisons was 0.05. Of the 15 two-way ANOVAs conducted, three (20%) found significant effects ($p < 0.05$).

Childhood sexual abuse had a significant effect on the Contemplation subscale of the PSOCQ ($p = .037$) (Table 3). Individuals with a history of sexual abuse had higher scores on this measure (M = 3.91, SD = .55) than individuals without a history of sexual abuse (M = 3.70, SD = .64). Additionally, the two-way ANOVA showed a significant effect of gender on the Pre-contemplation subscale of the PSOCQ ($p = .054$) (Table 4). Males (M = 3.08, SD = .63) scored significantly higher on this measure than did females (M = 2.86, SD = .73). Lastly, there was a significant effect of sexual abuse on the acceptance measure ($p = 0.042$) (Table 5). Individuals with a history of sexual abuse scored significantly higher on the Activities Engagement subscale of the CPAQ (M = 27.38, SD = 10.83) than individuals without a history of sexual abuse (M = 23.56, SD = 11.89).

Discussion

This exploratory study used two aims to investigate the complex relationship between childhood sexual abuse and CP. In the first aim, the incidence of sexual abuse among individuals with CP initially assessed at an interdisciplinary chronic pain management program was determined. The incidence of childhood sexual abuse was 20.1% for females and 10.7% for males, with an overall incidence of 16%. The overall incidence is similar to that of the general population, and lower than estimates from other CP populations, which range from 21-28% [3,4,7,8,12]. The higher incidence in females is a consistent trend observed in both the general and CP populations [8,12]. The similarity of incidence found in the present study to the general population indicates that a history of childhood sexual abuse is not associated with an increased risk of developing CP, or seeking help for a CP condition, among individuals initially assessed at our interdisciplinary chronic pain management program.

Next, psychometric findings on pain-related variables were compared between individuals with a history of abuse to those without. The first analysis utilized a case-control approach and did not show any significant differences, however, the two-way ANOVAs in the second analysis—comparing individuals with a history of sexual abuse to all individuals without a history of sexual abuse—showed three significant effects. Individuals with a history of sexual abuse had higher scores on the Activities Engagement subscale of the CPAQ, and on the Contemplation subscale of the PSOCQ. Also, males had higher scores on the Pre-contemplation subscale of

Table 2: Frequency statistics of demographic variables.

Gender				
		Frequency	Percent	Valid Percent
Valid	Male	172	45.1	45.1
	Female	209	54.9	54.9
	Total	381	100.0	100.0
Sexual Abuse				
		Frequency	Percent	Valid Percent
Valid	No	305	80.1	84.0
	Yes	58	15.2	16.0
	Total	363	95.3	100.0
Missing	System	18	4.7	
Total		381	100.0	
Born in Canada				
		Frequency	Percent	Valid Percent
Valid	Yes	264	69.3	71.9
	No	103	27.0	28.1
	Total	367	96.3	100.0
Missing	System	14	3.7	
Total		381	100.0	
Marital Status				
		Frequency	Percent	Valid Percent
Valid	Married or Common-law	215	56.4	58.4
	Single	78	20.5	21.2
	Divorced, Separated or Widowed	75	19.7	20.4
	Total	368	96.6	100.0
Missing	System	13	3.4	
Total		381	100.0	
Children				
		Frequency	Percent	Valid Percent
Valid	Yes	277	72.7	75.5
	No	90	23.6	24.5
	Total	367	96.3	100.0
Missing	System	14	3.7	
Total		381	100.0	
Employed				
		Frequency	Percent	Valid Percent
Valid	Yes	128	33.6	34.8
	No	240	63.0	65.2
	Total	368	96.6	100.0
Missing	System	13	3.4	
Total		381	100.0	
Nature of Injury				
		Frequency	Percent	Valid Percent
Valid	Work Related	57	15.0	16.1
	Motor Vehicle Accident	271	71.1	76.8
	Other	25	6.6	7.1
	Total	353	92.7	100.0
Missing	System	28	7.3	
Total		381	100.0	

the PSOCQ. The analyses of pain-related measures did not indicate that individuals with a history of sexual abuse had a worse CP experience, since these individuals did not have higher scores on measures of psychopathology (e.g., depressed mood, anxiety, pain catastrophizing) or lower scores on measures of ability to cope (e.g., acceptance of pain). This finding is inconsistent with the literature suggesting that individuals with a history of sexual abuse have worse scores on measures, such as anxiety and depression [8]. Instead, this

Table 3: ANOVA results for the Contemplation subscale of the PSOCQ.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.551	3	1.184	3.038	.029
Intercept	2289.887	1	2289.887	5877.107	.000
Gender	.308	1	.308	.791	.374
SA	1.707	1	1.707	4.380	.037
Gender * SA	.118	1	.118	.302	.583
Error	134.422	345	.390		
Total	5025.930	349			
Corrected Total	137.972	348			

Table 4: ANOVA results for the Pre-Contemplation subscale of the PSOCQ.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.241	3	1.747	3.648	.013
Intercept	1393.940	1	1393.940	2910.467	.000
Gender	1.789	1	1.789	3.735	.054
SA	.104	1	.104	.218	.641
Gender * SA	.060	1	.060	.126	.723
Error	165.234	345	.479		
Total	3254.140	349			
Corrected Total	170.476	348			

Table 5: ANOVA results for the Activities Engagement subscale of the CPAQ.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	674.707	3	224.902	1.638	.180
Intercept	102507.482	1	102507.482	746.674	.000
Gender	29.828	1	29.828	.217	.641
SA	573.795	1	573.795	4.180	.042
Gender * SA	179.412	1	179.412	1.307	.254
Error	47363.476	345	137.285		
Total	251035.000	349			
Corrected Total	48038.183	348			

study is more in line with the previous literature that did not find a significant association between childhood sexual abuse and a worse CP condition [4,6].

The significant effects from the two-way ANOVA indicate that individuals with a history of sexual abuse are more engaged in life activities regardless of their pain and are more likely to consider adopting a self-management approach to their CP, as measured by the CPAQ and PSOCQ, respectively. The PSOCQ measures readiness to adopt a self-management approach to CP [26]. In the pre-contemplation stage, the individual does not intend to adopt a self-management approach to CP, whereas in the contemplation stage the individual is considering adopting a self-management approach and is more interested in joining a self-management program [41]. The results of the present study indicate that males initially assessed at an interdisciplinary chronic pain management program contemplate adopting a self-management approach significantly less than do females. Additionally, individuals with a history of childhood sexual

abuse are more strongly considering adopting a self-management approach to CP and are more interested in joining a self-management program, compared to individuals without sexual abuse. Taken together, these results from the CPAQ and PSOCQ indicate that individuals with childhood sexual abuse may view and interpret their pain differently than those without a history of abuse. These effects of childhood sexual abuse in relation to CP have not been previously reported in the literature.

The phenomenon of resilience, which reflects "good outcomes in spite of serious threats to adaptation or development", may partially explain the results from the CPAQ and PSOCQ [42]. Resilience is commonly observed in individuals who have experienced childhood sexual abuse, and arises from "the normative functions of human adaptational systems" [43]. The Connor Davidson Resilience Scale (CD-RISC)—a measure used to assess internal resilience—assesses multiple dimensions of resilience, two of which are acceptance of change and action-oriented approach to solving problems [44]. In the present study, individuals with a history of sexual abuse had significantly higher scores on the contemplation subscale of the PSOCQ suggesting a higher level of readiness to adopt a self-management approach to their CP, or that they are more accepting of change and more action-oriented in terms of their approach to CP. Therefore, the overlap between these dimensions of resilience and the contemplation of a self-management approach to CP may indicate that individuals with a history of sexual abuse may be more resilient to their CP condition. Although the role of resilience in an individual's experience of CP has not previously been investigated, resilience of individuals with a history of sexual abuse has been shown to have a compensatory and a protective role in depression – a common co-morbidity in CP [45]. For young adults with higher sexual abuse, higher internal resilience is associated with fewer depressive symptoms, as measured by the CES-D [45]. The protective role of resilience observed in depression suggests that resilience may adaptively alter the way individuals perceive and deal with challenges later in life. It is possible that developing resiliency in response to childhood sexual abuse may enable these individuals to adapt better to their CP condition. This hypothesis needs to be further investigated in future studies.

The results of this study have several important clinical and educational implications. First, it is important for clinicians to consider that, as suggested by the results in the present study, individuals with a history of sexual abuse do not have a worse CP experience. Given that there is no difference in scores on pain-related variables between individuals with and without a history of sexual abuse, it is not necessary for CP treatments to specifically target abuse sequelae. For example, if individuals with a history of abuse had worse scores on measures of anxiety, then it may be beneficial to modify pain management treatment to target anxiety, thereby more effectively helping individuals with sexual abuse manage their CP. Therefore, the results of this study do not indicate that individuals with a history of sexual abuse require a different approach for treating their CP condition. Instead, clinicians must be informed that individuals with a history of sexual abuse and CP are more willing to adopt a self-management approach, and are more engaged in life activities despite pain.

Limitations

Limitations of the present study must be considered. First, the Michael G. DeGroote Pain Clinic included individuals with various types of CP, i.e., heterogeneous pain. Therefore; this study cannot identify any associations between childhood sexual abuse and specific types of CP, but rather heterogeneous pain. Secondly, data on the presence or absence of childhood sexual abuse relied on self-report measures. Due to the sensitive nature of sexual abuse, some individuals may not have disclosed experiencing abuse, thereby skewing the results towards an underestimation of incidence. Also, since this study utilized retrospective data, no causal associations can be inferred and the effects of sexual abuse on development of CP cannot be investigated. Finally, the two-way ANOVAs used unequal sample sizes because there were more individuals without a history of sexual abuse in this sample.

Due to the limitations, the results of this study must be cautiously generalized. When comparing or generalizing these results to other clinical CP populations, the following characteristic and methodological factors must be considered: types of CP included, composition of males and females, pain-related variables used to assess the impact of CP, and assessment method of childhood sexual abuse. Any variability in these factors between clinics may warrant careful consideration.

Future Research

Research should continue to investigate this relationship in different CP samples to gain further insight into the association. Specifically, future research may investigate the effects of childhood sexual abuse severity on pain-related variables. In the present study, history of childhood sexual abuse was categorized as being present or absent, and severity was not accounted for. Therefore, both individuals that had a brief experience of abuse and individuals that experienced years of abuse were all described as having a history of sexual abuse. It is possible that when severity of childhood sexual abuse is considered, different effects of sexual abuse on pain-related variables may become evident. Another future direction may involve investigating the differences in childhood, adult, and lifetime sexual abuse on CP. It has been reported that adolescent or adult sexual abuse—but not childhood sexual abuse—predict greater pain-related disability [4]. This indicates that sexual abuse may have different effects on CP depending on when the abuse occurred. Further research in this area will help build a comprehensive picture of the effects of childhood sexual abuse on development of CP.

Future studies should also investigate if there is a difference in the resiliency of individuals with and without a history of sexual abuse upon initial assessment for CP treatment. This will clarify if individuals who have a history of sexual abuse are indeed more resilient. Continuing to investigate the relationship between childhood sexual abuse and CP will help clinicians better understand how individuals with a history of sexual abuse differ in their experience and interpretation of their CP condition. Through gaining this understanding, clinicians may consider history of childhood sexual abuse in their approach to assessment and treatment of CP to most effectively help the individual patient. The relationship between resiliency and response to interdisciplinary CP treatment may also be

investigated.

Conclusion

The present study investigated the relationship between childhood sexual abuse and CP. The results show a 16% incidence of sexual abuse in individuals with CP initially assessed at an interdisciplinary chronic pain management program. Individuals with a history of sexual abuse had higher scores on the Activities Engagement subscale of the CPAQ, and on the Contemplation subscale of the PSOCQ. Also, males had higher scores on the Pre-contemplation subscale of the PSOCQ. These results indicate that individuals with a history of childhood sexual abuse have greater acceptance of pain in terms of higher engagement in daily activities regardless of pain, and are more ready to consider adopting a self-management approach to pain. Overall, these results suggest a role of childhood sexual abuse in adaptation to CP.

Acknowledgement

References

1. Otis JD, Keane TM, Kerns RD. An examination of the relationship between chronic pain and post-traumatic stress disorder. J Rehabil Res Dev. 2003; 40: 397-405.

2. Schopflocher D, Taenzer P, Jovey R. The prevalence of chronic pain in Canada. Pain Res Manag. 2011; 16: 445-450.

3. As-Sanie S, Clevenger LA, Geisser ME, Williams DA, Roth RS. History of abuse and its relationship to pain experience and depression in women with chronic pelvic pain. Am J Obstet Gynecol. 2014; 210: 317-317.

4. MacMillan HL, Tanaka M, Duku E, Vaillancourt T, Boyle MH. Child physical and sexual abuse in a community sample of young adults: Results from the Ontario Child Health Study. Child Abuse Negl. 2013; 37: 14-21.

5. Lampe A, Solder E, Ennemoser A, Schubert C, Rumpold G, Sollner W. Chronic pelvic pain and previous sexual abuse. Obstet Gynecol. 2000; 96: 929-933.

6. Fishbain DA, Bruns D, Meyer LJ, Lewis JE, Gao J, Disorbio JM. Exploration of affirmation of childhood molestation (sexual abuse) in chronic pain patients, acute pain patients, community patients with pain and community nonpatients without pain. Pain Pract. 2014; 14: 515-525.

7. Lampe A, Doering S, Rumpold G, Solder E, Krismer M, Kantner-Rumplmair W, et al. Chronic pain syndromes and their relation to childhood abuse and stressful life events. J Psychosom Res. 2003; 54: 361-367.

8. Jiao J, Vincent A, Cha SS, Luedtke CA, Oh TH. Association of abuse history with symptom severity and quality of life in patients with fibromyalgia. Rheumatol Int. 2015; 35: 547-553.

9. Finestone HM, Stenn P, Davies F, Stalker C, Fry R, Koumanis J. Chronic pain and health care utilization in women with a history of childhood sexual abuse. Child Abuse Negl. 2000; 24: 547-556.

10. Brown J, Berenson K, Cohen P. Documented and self-reported child abuse and adult pain in a community sample. Clin J Pain. 2005; 21: 374-377.

11. Linton SJ. A prospective study of the effects of sexual or physical abuse on back pain. Pain. 2002; 96: 347-351.

12. Molnar BE, Buka SL, Kessler RC. Child sexual abuse and subsequent psychopathology: Results from the National Comorbidity Survey. Am J Public Health. 2001; 91: 753-760.

13. Shipherd JC, Keyes M, Jovanovic T, Ready DJ, Baltzell D, Worley V, et al. Veterans seeking treatment for posttraumatic stress disorder: What about comorbid chronic pain? J Rehabil Res Dev. 2007; 44: 153-165.

14. Powers A, Fani N, Pallos A, Stevens J, Ressler KJ, Bradley B. Childhood abuse and the experience of pain in adulthood: The mediating effects of PTSD and emotion dysregulation on pain levels and pain-related functional impairment. Psychosomatics. 2014; 55: 491-499.

15. Raphael KG, Widom SC. Post-traumatic stress disorder moderates the relation between documented childhood victimization and pain 30 years later. Pain. 2011; 152: 163-169.

16. Pollard CA. The relationship of family environment to CP disability [Dissertation]. San Diego, California, USA: California School of Professional Psychology. Dissertation Abstracts International. 1981; 42: 2077.

17. Pollard CA. Preliminary validity study of the pain disability index. Percept Mot Skills. 1984; 59: 974.

18. Tait RC, Chibnall JT, Krause S. The pain disability index: psychometric properties. Pain. 1990; 40: 171-182.

19. Gronblad M, Hupli M, Wennerstrand P, Jarvinen E, Lukinmaa A, Kouri JP, et al. Intercorrelation and test-retest reliability of the Pain Disability Index (PDI) and the Oswestry Disability Questionnaire (ODQ) and their correlation with pain intensity in low back pain patients. Clin J Pain. 1993; 9: 189-195.

20. Hapidou EG, Safdar S, MacKay KD. Evaluation of an inpatient CP management program. Pain Res Manag. 1997; 2: 63.

21. Jerome A, Gross RT. Pain disability index: Construct and discriminant validity. Arch Phys Med Rehabil. 1991; 72: 920-922.

22. Tan G, Jensen MP, Thornby JI, Shanti BF. Validation of the brief pain inventory for chronic nonmalignant pain. J Pain. 2004; 5: 133-137.

23. Sullivan MJL, Bishop S, Pivik J. The pain catastrophizing scale: Development and validation. Psychol Assess. 1995; 7: 524-532.

24. Osman A, Barrios FX, Gutierrez PM, Kopper BA, Merrifield T, Grittmann L. The pain catastrophizing scale: Further psychometric evaluation with adult samples. J Behav Med. 2000; 23: 351-365.

25. Spitzer RL, Williams JB, Kroenke K, Linzer M, DeGruy FV, Hahn SR, et al. Utility of a new procedure for diagnosing mental disorders in primary care. The PRIME-MD 1000 study. JAMA. 1994; 272: 1749-1756.

26. Kerns RD, Rosenberg R, Jamison RN, Caudill MA, Haythornthwaite J. Readiness to adopt a self-management approach to CP: The Pain Stages of Change Questionnaire (PSOCQ). Pain. 1997; 72: 227-234.

27. Kerns RD, Rosenberg R. Predicting responses to self-management treatments for CP: Application of the pain stages of change model. Pain. 2000; 84: 49-55.

28. Hapidou EG, Abbasi H. Readiness to adopt a self-management approach to CP and treatment outcomes. Poster presented at the 3rd World Congress. Barcelona, Spain: World Institute of Pain. 2004.

29. Williams RM, Hapidou EG, Lin CYA, Abbasi H. Examining the pain stages of change questionnaire in Chronic Pain. Physiother Can. 2007; 59: 132-141.

30. McCracken LM, Vowles KE, Eccleston C. Acceptance-based treatment for persons with complex, long standing CP: A preliminary analysis of treatment outcome in comparison to a waiting phase. Behav Res Ther. 2005; 43: 1335-1346.

31. McCracken LM, Vowles KE, Eccleston C. Acceptance of Chronic Pain: Component analysis and a revised assessment method. Pain. 2004; 107: 159-166.

32. Woby SR, Roach NK, Urmston M, Watson PJ. Psychometric properties of the TSK-11: A shortened version of the Tampa Scale for Kinesiophobia. Pain. 2005; 117: 137-144.

33. Hapidou EG, O'Brien MA, Pierrynowski MR, De lasHeras E, Patel M, Patla T. Fear and avoidance of movement in people with CP: Psychometric properties of the 11-item Tampa Scale for Kinesiophobia (TSK-11). Physiotherapy Canada. 2012; 64: 235-241.

34. Hudson WW. The WALMYR Assessment Scales Scoring Manual. Tempe, Arizona, USA: WALMYR. 1992.

35. Westhius D, Thyer BA. Development and validation of the Clinical Anxiety Scale: A rapid assessment for empirical practice. EducPsychol Meas. 1989; 24: 267-279.

36. Radloff LS. The CES-D Scale: A self-report depression scale for research in general population. ApplPsychol Meas. 1977; 1: 385-401.

37. Magni G, Moreschi C, Rigatti-Luchini S, Merskey H. Prospective study on the relationship between depressive symptoms and chronic musculoskeletal pain. Pain. 1994; 56: 289-297.

38. Turk DC, Okifuji A, Scharff L. Chronic Pain and depression: Role of perceived impact and perceived control in different age cohorts. Pain. 1995; 61: 93-101.

39. Geisser ME, Roth RS, Robinson ME. Assessing depression among persons with CP using the center for epidemiological studies-depression scale and the beck depression inventory: A comparative analysis. Clin J Pain. 1997; 13: 163-170.

40. Turk DC, Okifuji A. Detecting depression in Chronic Pain patients: Adequacy of self-reports. Behav Res Ther. 1994; 32: 9-16.

41. Carr JL, KlaberMoffett JA, Sharp DM, Haines DR. Is the Pain Stages of

Change Questionnaire (PSOCQ) a useful tool for predicting participation in a self-management programme? Further evidence of validity, on a sample of UK pain clinic patients. BMC Musculoskelet Disord. 2006; 7: 1-7.

42. Masten AS. Ordinary magic: Resilience processes in development. Am Psychol. 2001; 158: 1878-1882.

43. Domhardt M, Munzer A, Fegert JM, Goldbeck L. Resilience in survivors of child sexual abuse: A systematic review of the literature. Trauma Violence Abuse. 2015; 16: 476-493.

44. Connor KM, Davidson JR. Development of a new resilience scale: The Connor Davidson Resilience Scale (CD-RISC). Depress Anxiety. 2003; 18: 76-82.

45. Goldstein AL, Faulkner B, Wekerle C. The relationship among internal resilience, smoking, alcohol use, and depression symptoms in emerging adults transitioning out of child welfare. Child Abuse Negl. 2013; 37: 22-32.

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