

The Impact of Sexual or Physical Abuse History on Pain-Related Outcomes Among Blacks and Whites with Chronic Pain: Gender Influence

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Abstract

Objectives. Physical and sexual abuses commonly co-occur with chronic pain. We hypothesized that: 1) abuse history questions would form distinct factors that relate differently to pain perceptions and pain outcomes; 2) abuse history consequences on physical and mental health differ by gender; and 3) different abuse types and age of occurrence (childhood vs adolescent/adulthood) predict different negative outcomes.

Methods. Chronic pain patients at a tertiary care pain center provided data (64% women, 50% black) through a confidential survey. Factors were formed for abuse type and age. Linear regression, controlling for socio-demographic information, was used to examine the relationship between abuse and abuse by sex interactions with pain-related outcomes.

Results. Six 3-item abuse factors ($\alpha = 0.77\text{--}0.91$)—sexual molestation, sexual penetration, and physical abuse—were identified in both childhood and adulthood. Lifetime prevalence of abuse was 70% for men and 65% for women. Women experienced lower physical abuse ($P = 0.01$) in childhood, and higher penetration ($P = 0.02$) in adulthood. Decreased general health was associated with all

abuse types ($P < 0.05$) in childhood. Affective pain was associated with all childhood abuse scales and adulthood molestation, though childhood molestation only for men ($P = 0.04$). Disability was associated with childhood ($P = 0.02$) and adulthood rape ($P = 0.04$). Men with childhood or adulthood molestation ($P = 0.02$; $P = 0.02$) reported higher post-traumatic stress disorder.

Conclusions. Our study confirms physical and mental health, and pain-related outcomes are affected by abuse history for men and women. These results support screening all patients for abuse to improve the survivor's overall health and well-being.

Key Words. Physical Abuse; Sexual Abuse; Gender; Chronic Pain; Race; Health

Introduction

Physical abuse and sexual abuse are pervasive problems affecting both men and women. Abuse has long been identified as a significant public health problem, posing multiple threats to its victims [1], including higher prevalence of chronic pain. Fillingim et al. [2] and Davis et al. [3] found abuse history to be more prevalent among people with chronic pain than the general public. Linton [4] asked a randomly selected sample of 35 to 45-year-olds about musculoskeletal pain and found both physical and sexual abuse rates increased in a linear fashion when comparing no pain with mild pain to pronounced pain experienced in the last year. In addition to higher chronic pain rates, Green and colleagues found that women with an abuse history had different pain symptoms and poorer adjustment to pain than nonabused women with chronic pain [5]. This is in contrast to Fillingim and Edwards's work describing lower sensitization and higher pain threshold for experimental pain by abused college students [6], though the subset of the population attending college may be systematically different than a broader and more representative population. In addition, the brain processes in response to chronic pain have been shown to be significantly more complex than those involved in experimental pain [7]. Thus, abuse in the clinical setting in a diverse population may be related to a component not involved in experimental pain in a select population.

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People with chronic pain and an abuse history also have poorer pain-related outcomes than those who were not abused, including greater number of psychiatric diagnoses, poorer adjustment, and higher health service usage [8,9]. Likewise, Spertus et al. examined chronic pain patients and a variety of traumatic experiences including physical and sexual abuse, and found that trauma was related to more anxiety and depression, even after controlling for pain severity [10].

Both childhood and adulthood sexual abuse have long-lasting consequences. Most studies of abuse and pain report lifetime abuse rates [8,9] or childhood abuse only [11–13], but important information is lost with these methods. Green et al. found that among females with chronic pain at a tertiary pain center, chronic abuse (abuse experienced in both childhood and adulthood) had stronger negative pain consequences than no abuse or abuse experienced at only one time point [5]. While a study in the general population reported the effects of an earlier abuse age are greater [11], the comparison has not been made in a diverse chronic pain population.

The abuse and pain literature also often fails to distinguish between physical abuse and sexual abuse in predicting abuse's impact on physical and mental health. However, the distinction is important for optimizing care [14,15]. In separate studies, Green et al. and Spertus et al. both found that chronic pain patients with both physical abuse and sexual abuse histories have poorer adjustment to pain than nonabused patients or patients with only one type of abuse [10,16]. Findings are mixed on whether the effect of abuse type (physical vs sexual) is comparable [17] or the domains affected are different [18], although sexual abuse is more commonly found to have a larger negative impact than physical abuse [19,20].

Aside from studies specific to pelvic pain or irritable bowel syndrome [21,22], even fewer abuse and pain studies have distinguished characteristics of different kinds of sexual abuse, although there is evidence that not all types of abuse have the same effect. In the nonpain-specific literature, Fergusson et al. separate abuse variables by contact vs noncontact, and Bendixen et al. [23] found more physical and mental health symptoms when abuse severity is higher, with some studies specifically pinpointing rape being associated with worse consequences [9,19,24,25]. In one of the few pain-related studies to distinguish types of sexual abuse [24], only rape was predictive of presence and frequency of fibromyalgia symptoms [24].

Sexual abuse is less common in men than women (14% vs 32%) [26,27] and also less studied [28,29], potentially giving the impression that men do not have the same negative health outcomes as women. There is disagreement about whether male victims of both physical and sexual abuse have equal [26] or lesser [11,30,31] consequences than women. Overall, studies focusing on pain have rarely looked at gender differences. However, one chronic pain study examining traumatic experiences

included physical and sexual abuse and suggested that interactions may exist and that men with higher level of abuse experienced more emotional distress than women with comparable abuse levels [10].

Physical and sexual abuse among men and women with chronic pain as well as potential relationships between abuse types to later health outcomes deserve further study. Clinical experience suggests that abuse occurs in both men and women with chronic pain. This study aims to examine physical abuse and sexual abuse history, separating penetration from other types of sexual abuse in ethnically diverse men and women with chronic pain to see how different types of abuse and the age of occurrence (childhood or older) relate to the pain experience. Self-reported abuse information was used, as this measure is most consistently found to be related to physical and mental health outcomes [32]. We hypothesized that: 1) items pertaining to abuse history would form distinct factors that could be used to examine the effects of different abuse types and age when abuse occurred on current pain perceptions and pain outcomes; 2) abuse history and its consequences on physical and mental health differ by gender; and 3) different abuse types and age of occurrence (i.e., childhood vs adolescent or adulthood) predict different negative outcomes.

Methods

This prospective observation study combined medical records and survey data and was conducted with Institutional Review Board approval from the University of Michigan Health System and written informed consent from each participant. Black and white patients 18 to 50 years old were recruited as has been described previously [33,34], with a study focus on examining racial disparities in pain-related outcomes in people living with chronic pain. Other racial groups were excluded based on low representation at the clinic and an inability to make statistical comparisons. Socio-demographic information (e.g., age, race, gender) were collected from the clinic admission Patient Assessment and Narrative booklet once consent was obtained. Surveys were then given or mailed to subjects with a business reply envelope using the Dillman's Total Design Method™ [35]. The survey was designed to be filled out at home and returned with no personal identifiers other than study number.

Measures

The Drossman Abuse Questionnaire (DAQ) was developed using multiple, specific abuse behaviors to measure sexual and physical abuse during "childhood" (<14 years old) and "adulthood" (age ≥14 years old) as compared with shorter questionnaires or less consistent age divisions [36]. The written DAQ has good test-retest reliability (0.81 for sexual abuse, 0.70 for physical abuse) [36]. All questions began with the root, "Has anyone ever, against your wishes . . ." followed by a set of specific abusive

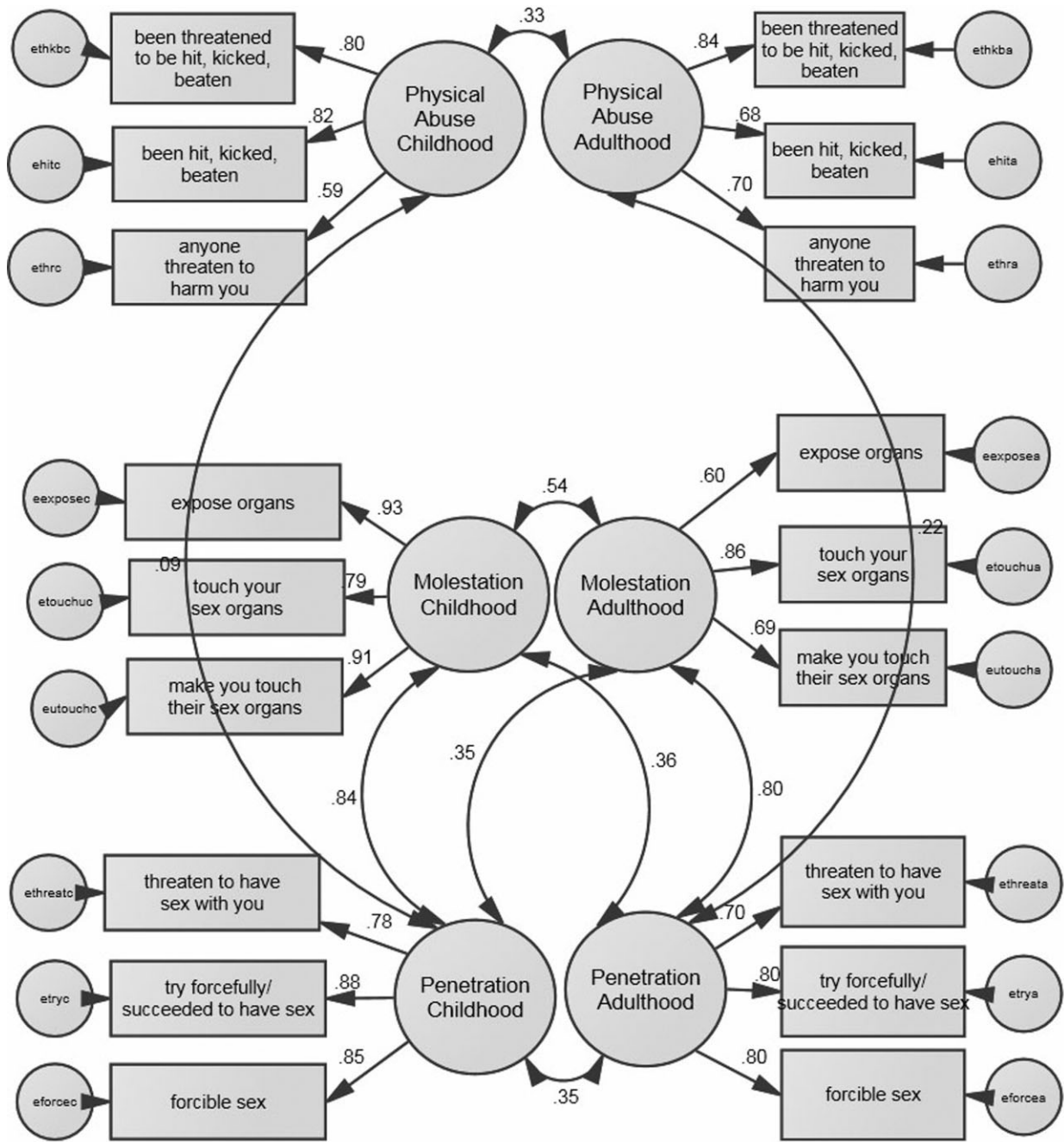


Figure 1 Confirmatory factor analysis of abuse variables.

behaviors including, “hit, kick or beat you,” “exposed their sexual organs to you,” and “forced you to have sex when you did not want this.” Nine behaviors were considered separately for age 13 and younger and for age 14 and older, yielding a total of 18 questions. Specific item wording is available in Figure 1.

The Health Outcomes Survey Short Form (SF-36) is widely used in medical settings. It has 36 questions allocated to

eight scales: physical function, physical role, bodily pain, general health perceptions, vitality, social function, mental health, and role emotional [37]. The general health and mental health subscales were used in the current analyses, with published Cronbach’s α reliabilities of 0.79 and 0.90, respectively, for people under 65 years old, which were comparable across race and gender groups [38]. In our study, the Cronbach’s α reliabilities were 0.80 and 0.85.

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The McGill Pain Questionnaire (MPQ) uses 20 sets of descriptive words to categorize pain. It is widely administered clinically via pencil and paper as part of initial pain assessment. The four subscales: sensory, affective, evaluative, and miscellaneous, were all used in this study. The MPQ has a 0.70 test–retest consistency for the total pain rating index score [39]. In our study, Cronbach's α reliabilities range 0.55–0.73 with only MPQ miscellaneous, which is not really intended as a scale, per se, falling below 0.65.

The Pain Disability Index is a 7-item self-report instrument evaluating degree of pain interference with functioning across seven domains, family/home, recreation, social activity, occupation, sexual behavior, self-care and life-support (0 = no disability; 10 = total disability; maximum disability = 70) [40]. Internal consistencies have been reported for the instrument ranging from 0.78–0.93 [41]. A weighted sum, allowing for up to two missing responses, was used in the analyses. Cronbach's α reliability of the scale in our sample is 0.86.

The Posttraumatic Chronic Pain Test (PCPT) is a screening test for people at risk for post-traumatic stress disorder (PTSD; a syndrome characterized by the development of a phobic reaction to environmental and ideational stimuli associated with the original traumatic event) caused by the event that led to their chronic pain symptoms. Test–retest consistency for the instrument has been reported at 0.90 and split-half reliability at 0.59 [42]. Only people for whom pain originates from trauma (e.g., accident, injury, surgery) provided responses. For all others, PCPT was coded as 0. The six questions are scored (0 = not at all; 6 = very much) and responses were summed for the current analyses [43]. Cronbach's α scale reliability ranged from $\alpha = 0.84$ for accidents at home to $\alpha = 0.92$ following surgery.

Statistical Analysis

All statistical analyses were performed using the Statistical Package for Social Sciences 15.0® (SPSS Inc., Chicago, IL, USA) and AMOS 6.0® (Smallwaters Corp., Chicago, IL, USA). Analyses followed the following plan:

1. Descriptive statistics were performed.
2. Abuse scales were defined based on the distinct age and abuse type categories suggested in the literature and confirmed via confirmatory factor analysis (CFA); reliability tests were done by group to ensure factors worked for all race/gender subgroups.
3. Abused and nonabused participants were compared on demographic variables using ANOVA and chi-square tests to determine additional controls for the multivariate analyses.
4. Linear regressions were then run to determine whether the various abuse scales predicted pain and quality of life measures with: 1) gender (male = 1), race (black = 1), and education (an ordinal 6-point scale) added in the first block; 2) abuse total for the particular abuse type added in the second block; and 3) the abuse X gender interaction term added in the third

block as recommended by Pedhazur [44]. Separate analyses were run for each abuse type and outcome.

Results

Sample Description

From the 225 people eligible for the study, 183 were recruited (81%), 12 declined (5%), and 30 could not be contacted (13%) due to appointment changes. Mean age was 38 years (range 21–50); 50% were black and 64% were female. Most participants were educated (63% >high school education), married or had a significant other (51%), and employed (58%). The sample was heterogeneous in terms of pain cause and diagnosis, with reported pain locations (allowing for multiple locations) from the leg (63%), back (56%), hip/pelvis (54%) or arm/shoulder (43%), and participants reported pain for approximately 5 years (60 ± 82 months). Nearly half (46%) reported that an accident was the primary cause of their pain. The 164 participants who completed the DAQ were included in analyses.

Abused vs Nonabused Comparison

Abused participants were more likely to be black (Pearson's $\chi^2 = 3.75$, $P = 0.05$) and were more educated ($F = 4.27$, $P = 0.04$) than nonabused participants. They did not differ by age, gender, employment status, or marital status. As race and education are often related to the health outcomes of interest, they were included as controls in the first block of regression analyses.

Abuse Factors

The abuse questions were split into childhood and adulthood, then further split into physical abuse, molestation, and penetration questions. This configuration of items as six scales was then confirmed through CFA (IFI = 0.89, RMSEA = 0.09, χ^2 [df = 126] = 321.39, $P < 0.001$; β range = 0.59–0.93) and reliability analysis ($\alpha = 0.77$ –0.91). Subgroup reliabilities as measured by Cronbach's α were 0.69 and higher for all four groups when scales reflecting three separate childhood factors were examined. Adult abuse variables did not have as strong a reliability; in particular, black males had reliability for sexual molestation of 0.30. All other scales had reliabilities of 0.59 or higher, with physical abuse in white males again being lowest. The CFA model with factor loadings is available in Figure 1. All questions had the root “did anyone ever against your wishes . . .” The scales formed for childhood and adulthood were: *molestation*, 1) expose their sex organs to you?, 2) touch your sex organs?, and 3) make you touch their sex organs?; *sexual penetration*, 1) threaten to have sex with you?, 2) try forcibly or succeed to have sex with you when you did not want this?, and 3) have forcible sex with you when you did not desire sex?; and *physical abuse*, 1) hit, kick or beat you?, 2) threaten to hit, kick or beat you?, and 3) threaten to harm you? Responses to the yes/no questions were added to form the six scales used in the analyses, such that all scales ranged from 0 to 3.

Abuse in the Sample

Most (67%) participants reported being physically or sexually abused or threatened (women 65% vs men 70%) at least once in their lifetime. The highest abuse score reported for the 3-point scales was physical abuse during adulthood (0.98 ± 1.18), with molestation in adulthood being the lowest reported (0.31 ± 0.75). Women indicated significantly higher levels of sexual penetration in adulthood (0.57 vs 0.22 , $P = 0.02$) and significantly lower levels of physical abuse in childhood (0.69 vs 1.17 , $P = .01$) than men. When compared with whites, blacks experienced significantly more physical abuse in childhood (1.06 vs 0.69 , $P = 0.03$).

A four-group gender/racial split revealed that penetration in both adulthood and childhood, and physical abuse in childhood, were significantly different. Group comparisons and overall scores are available in Table 1. Bonferroni multiple comparisons tests suggest that for childhood penetration, black women had the highest scores ($P = 0.04$) compared with white women. Scores for men were not different from either set of women's scores. For adult penetration, black women had the highest scores ($P = 0.05$) compared with white men who had the lowest scores. Other pairs were not different. For physical abuse in childhood, white women had lower scores than all other groups ($P = 0.02$ vs black men; $P = 0.03$ vs black women and $P = 0.009$ vs white men). No significant differences were found in other paired comparisons. Figure 2 shows a comparison of abuse scores by abuse type and group.

Association Between Abuse and General and Mental Health

Regression analysis was used to test the relationship between abuse and general and mental health. Table 2 provides regression statistics related to general and mental health for all the abuse predictive models. For the abuse variables studied, only penetration in childhood was significantly associated with self-reported general health, with higher abuse scores related to worse health ($P = 0.02$). However, all childhood abuse variables were associated with worse mental health ($P \leq 0.01$).

Association Between Abuse and Pain Outcomes

Abuse was not associated with sensory pain. Affective pain, however, was predicted by physical abuse during childhood ($P = 0.01$), and sexual penetration in childhood ($P = 0.01$). For men only, molestation in childhood was also significantly associated with higher affective pain ($P = 0.04$). Miscellaneous pain was related to molestation in adulthood ($P = 0.03$). None of the relationships between evaluative pain and the abuse scales were significant. Table 3 shows the regression statistics for sensory, affective, and miscellaneous scales as predicted by abuse. Figure 3A shows the interaction between gender and childhood molestation for affective pain.

Table 1 Means, standard deviations, percentage of nonzero responses, and group differences for abuse scales by sex and race

	Black Men (N = 32)	Black Women (N = 50)	White Men (N = 28)	White Women (N = 54)	Overall (N = 164)
Intercourse in childhood: Σ (threat, attempt, and actual forced sex)	M \pm SD Percentage 0.22 \pm 0.71 ^{ab} 50.0 ^{ab}	0.72 \pm 0.90 ^a 50.0 ^a	0.29 \pm 0.85 ^{ab} 53.6 ^{ab}	0.26 \pm 0.66 ^b 26.4 ^b	0.37 \pm 0.87* 48.9 ⁱ
Molestation in childhood: Σ (organ exposure, touching, and forcing to touch)	M \pm SD Percentage 0.30 \pm 0.79 15.6 ^{ab}	0.74 \pm 1.15 34.0 ^a	0.29 \pm 0.85 10.7 ^b	0.42 \pm 0.99 17.0 ^{ab}	0.46 \pm 1.00 29.1*
Intercourse in adulthood: Σ (threat, attempt, and actual forced sex)	M \pm SD Percentage 0.56 \pm 0.80 ^{ab} 40.6	0.84 \pm 0.96 ^a 52.0	0.39 \pm 0.63 ^b 32.1	0.53 \pm 0.88 ^{ab} 34.6	0.44 \pm 0.90* 46.2
Molestation in adulthood: Σ (organ exposure, touching, and forcing to touch)	M \pm SD Percentage 0.31 \pm 0.59 25.0	0.38 \pm 0.89 24.0	0.18 \pm 0.67 7.1	0.30 \pm 0.82 14.8	0.31 \pm 0.75 26.4
Physical abuse in childhood: Σ (hit, kick; threat of hit, kick, and threat of harm)	M \pm SD Percentage 1.13 \pm 1.29 ^a 46.9 ^{ab}	1.00 \pm 1.18 ^a 50.0 ^a	1.21 \pm 1.13 ^a 64.3 ^a	0.40 \pm 0.83 ^b 23.6 ^b	0.87 \pm 1.13* 48.4**
Physical abuse in adulthood: Σ (hit, kick; threat of hit, kick, and threat of harm)	M \pm SD Percentage 1.09 \pm 1.12 56.3	1.18 \pm 1.35 48.0	1.00 \pm 1.05 57.1	0.67 \pm 1.06 34.6	0.98 \pm 1.18 51.6

^{ab} Letters shared indicate no paired group differences; different letters are statistically significant.

** indicates $P \leq 0.01$ for overall group difference; * ≤ 0.05 ; ⁱ ≤ 0.10 .

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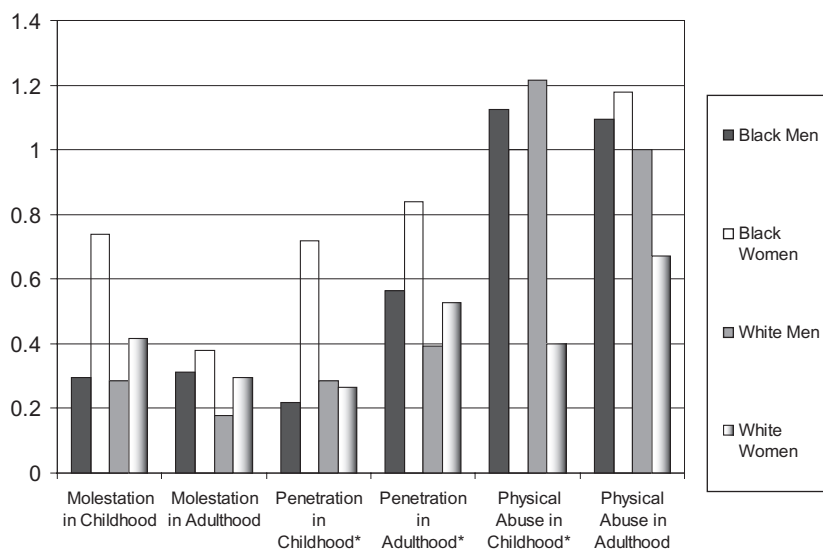


Figure 2 Mean level of abuse variables by race and gender. * Significantly different by group, $P < 0.05$.

Table 2 Regression statistics: Abuse scales predicting SF-36 general and mental health, controlling for race, sex, and education

	General Health				Mental Health			
	$R^2\Delta/R^2$	F	β	P	$R^2\Delta$	F	β	P
All models (block 1)	0.06	3.25		0.02	0.03	1.40		0.25
Black race	—	—	-0.14		—	—	0.03	
Male sex	—	—	0.02		—	—	-0.03	
Education	—	—	0.21		—	—	0.16	
Model 1 (blocks 2 and 3)								
2. Molestation in childhood	0.01	1.77	-0.11	0.19	0.05	7.26	-0.22	0.01
3. Molestation in childhood \times male	0.01	0.98	-0.10	0.32	0.00	0.34	-0.06	0.56
R^2 Overall model	0.08	2.51		0.03	0.08	2.38		0.04
Model 2 (blocks 2 and 3)								
2. Molestation in adulthood	0.00	0.01	0.01	0.94	0.01	1.92	-0.11	0.17
3. Molestation in adulthood \times male	0.00	0.14	-0.01	0.91	0.00	0.02	-0.01	0.89
R^2 Overall model	0.07	1.99		0.08	0.04	1.24		0.29
Model 3 (blocks 2 and 3)								
2. Penetration in childhood	0.03	5.32	-0.19	0.02	0.08	12.72	-0.29	0.00
3. Penetration in childhood \times male	0.00	0.07	-0.03	0.79	0.00	0.68	0.10	0.41
R^2 Overall model	0.10	3.04		0.01	0.11	3.60		0.00
Model 4 (blocks 2 and 3)								
2. Penetration in adulthood	0.00	0.09	0.02	0.77	0.01	1.49	-0.10	0.23
3. Penetration in adulthood \times male	0.00	0.43	-0.07	0.51	0.00	0.08	0.03	0.78
R^2 Overall model	0.07	2.02		0.07	0.04	1.23		0.30
Model 5 (blocks 2 and 3)								
2. Physical abuse in childhood	0.02	2.70	-0.14	0.10	0.05	7.45	-0.22	0.01
3. Physical abuse in childhood \times male	0.00	0.01	-0.01	0.93	0.00	0.20	0.06	0.65
R^2 Overall model	0.08	2.58		0.03	0.08	2.47		0.04
Model 6 (blocks 2 and 3)								
2. Physical abuse in adulthood	0.00	0.15	-0.02	0.82	0.02	3.59	-0.15	0.06
3. Physical abuse in adulthood \times male	0.02	2.54	-0.19	0.11	0.01	0.85	-0.11	0.35
R^2 Overall model	0.08	2.56		0.03	0.05	1.92		0.10

Bold denotes significance $P \leq 0.10$.

Table 3 Regression statistics: Abuse scales predicting MPQ pain scales, controlling for race, sex, and education

	Sensory Pain				Affective Pain				Miscellaneous Pain			
	<i>R</i> ² Δ	<i>F</i>	β	<i>P</i>	<i>R</i> ² Δ	<i>F</i>	β	<i>P</i>	<i>R</i> ² Δ	<i>F</i>	β	<i>P</i>
All models (block 1)	0.09	4.32		0.01	0.05	2.30		0.08	0.08	4.15		0.01
Black race	—	—	0.09		—	—	0.08		—	—	0.06	
Male sex	—	—	0.00		—	—	0.01		—	—	-0.05	
Education	—	—	-0.27		—	—	-0.20		—	—	-0.28	
Model 1 (blocks 2 and 3)												
2. Molestation in childhood	0.01	0.74	-0.07	0.39	0.00	0.03	-0.01	0.87	0.00	0.01	0.01	0.91
3. Molestation in childhood × male	0.01	0.88	0.09	0.35	0.03	4.41	0.21	0.04	0.02	3.04	0.17	0.08
<i>R</i> ² Overall model	0.10	2.91		0.02	0.08	2.29		0.05	0.10	3.12		0.01
Model 2 (blocks 2 and 3)												
2. Molestation in adulthood	0.01	1.29	0.09	0.26	0.02	3.67	0.16	0.06	0.03	4.86	0.18	0.03
3. Molestation adulthood × male	0.01	1.22	-0.11	0.27	0.00	0.27	0.05	0.64	0.00	0.61	0.08	0.44
<i>R</i> ² Overall model	0.10	3.15		0.01	0.07	2.23		0.06	0.12	3.70		0.01
Model 3 (blocks 2 and 3)												
2. Penetration in childhood	0.01	1.04	0.09	0.31	0.04	6.70	0.21	0.01	0.02	2.34	0.13	0.13
3. Penetration in childhood × male	0.02	2.47	0.20	0.12	0.01	1.53	0.15	0.22	0.02	2.72	0.20	0.10
<i>R</i> ² Overall model	0.11	3.33		0.01	0.10	3.09		0.01	0.11	3.59		0.00
Model 4 (blocks 2 and 3)												
2. Penetration in adulthood	0.01	2.14	0.12	0.15	0.00	0.67	0.07	0.41	0.01	1.72	0.11	0.19
3. Penetration in adulthood × male	0.00	0.06	-0.03	0.80	0.00	0.05	-0.02	0.82	0.00	0.59	0.08	0.44
<i>R</i> ² Overall model	0.10	3.15		0.01	0.05	1.60		0.17	0.10	3.12		0.01
Model 5 (blocks 2 and 3)												
2. Physical abuse in childhood	0.01	1.88	0.12	0.17	0.04	6.46	0.21	0.01	0.02	2.76	0.14	0.10
3. Child physical abuse × male	0.02	2.62	0.22	0.11	0.01	0.71	0.11	0.40	0.01	1.41	0.16	0.24
<i>R</i> ² Overall model	0.12	3.66		0.00	0.09	2.95		0.14	0.11	3.53		0.01
Model 6 (blocks 2 and 3)												
2. Physical abuse in adulthood	0.02	3.58	0.16	0.06	0.02	2.50	0.13	0.12	0.01	1.54	0.10	0.22
3. Adult physical abuse × male	0.00	0.00	0.00	0.98	0.01	1.83	0.16	0.18	0.01	2.01	0.17	0.16
<i>R</i> ² Overall model	0.11	3.45		0.001	0.08	2.36		0.04	0.11	3.40		0.01

Bold denotes significance *P* ≤ 0.10.

Sexual penetration scores in both childhood (*P* = 0.02) and adulthood (*P* = 0.04) predicted higher pain-related disability. The regression statistics for both disability and PTSD symptoms are shown in Table 4.

Abuse did not significantly predict pain-related PTSD alone. The sexual molestation abuse scales interacted with sex, however, such that men with higher abuse scores had higher levels of PTSD than nonabused men or women (*P* = 0.02 for both molestation interactions). Women reporting abuse were equally likely to have PTSD as those not reporting abuse. Men without abuse had the lowest PTSD scores, and men reporting abuse had the highest levels of PTSD (Table 4 and Figure 3B,C).

Discussion

The literature supports differences in the chronic pain experience based upon race, gender, age, socioeconomic status, and type of pain [45–49]. This study enhances the

literature by providing new insights into the role physical and sexual abuse history has on health in ethnically diverse men and women with chronic pain. We confirmed the existence of six abuse factors that distinguish between abuse type, and age when abuse occurred so that we could look at age of abuse, abuse type, and gender differences in outcomes following abuse.

Prevalence and Consequences of Abuse

Bailey et al. [8] and Linton [4] examined abuse rates in both clinical and community samples. The overall abuse rates in our chronic pain clinical sample were comparable with other clinical samples, but higher than community samples in the two studies [4,8] and other studies looking only at community samples [26,30]. Study rates were similar to studies examining psychiatric samples conducted by Read and Fraser and others [50–52], potentially reflecting the higher psychological morbidity among those referred to pain clinics [53,54]. Nonetheless, the sexual

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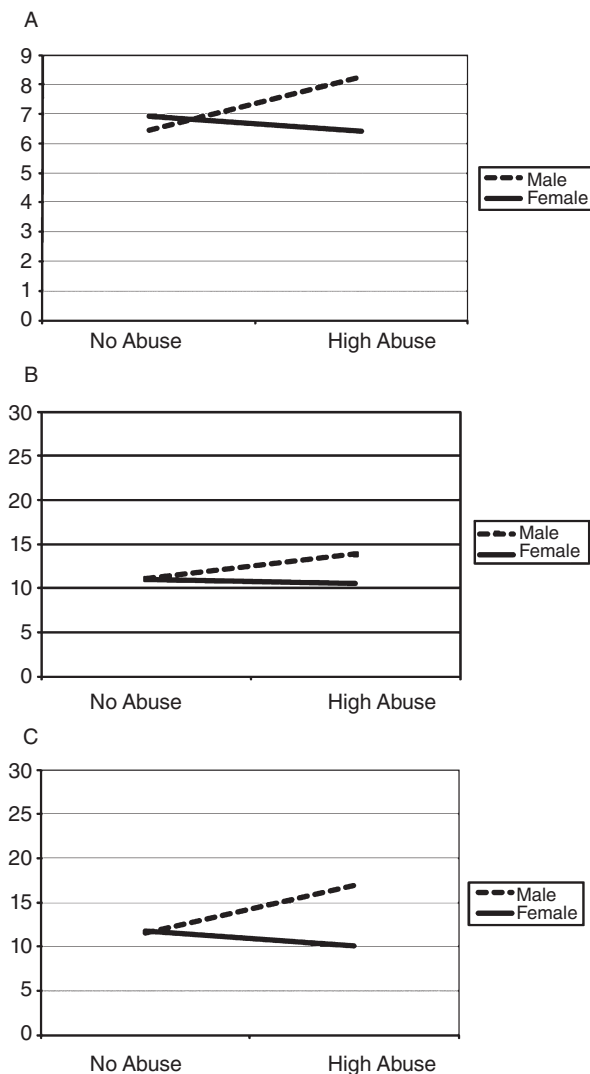


Figure 3 Abuse by gender interactions on pain-related outcomes. (A) MPQ affective as predicted by molestation in childhood ($F_{5, 140} = 2.29, P < 0.01, P = 0.05, t = 2.47, P = 0.02$); (B) PTSD predicted by molestation in childhood ($F_{5, 127} = 5.27, P < 0.01, t = 2.47, P = 0.02$); (C) PTSD predicted by molestation in adulthood ($F_{5, 128} = 5.28, P < 0.01, P = 0.05, f = 2.37, P = 0.02$). MPQ = McGill Pain Questionnaire; PTSD = post-traumatic stress disorder.

abuse rate for men in our sample is higher than in most other studies. Hooper and Warwick [55] found that males are often in contact with their providers for many years before disclosing a sexual or physical abuse history, where women are more likely to disclose an abuse event early on in their patient–physician interactions. This may reveal a reluctance on the part of men to share this information before trust is well established. The study findings sup-

porting higher abuse rates among men than previously reported may be due to our data collection technique where anonymity was assured, thereby bypassing whatever hesitation they may normally have in sharing. Another factor may be the pain center’s multidisciplinary practices at the time participants were recruited, including psychological and social services that may encourage fuller disclosure. It is also possible that including data on sexual threats, rather than contact-only abuse, elevated reporting for men. As rates for women were comparable with other samples however, this explanation seems unlikely, but further study is necessary to confirm these findings while using this methodology in diverse and representative populations of men.

In a representative community sample in the southern United States, Scher et al. [56] found that lower education was related to higher rates of childhood maltreatment. Childhood abuse has been shown to be related to academic difficulties [57] and dropout [58], and so can be expected to be related to lower academic attainment. On the contrary, unlike other studies, our study is the first to our knowledge revealing a positive relationship between education and abuse history. Literature does not provide explanations for this relationship. Thus, future studies should explore whether there are differences in referral patterns to a tertiary pain center in a university community. Controlling for education in the multivariate analyses ensured that findings were not confounded with educational differences. Further studies should use similar methods to confirm this finding and ensure that our finding is not an anomaly of a population with access to the pain clinic.

Similar to the findings of Briere and Elliott [11] and Burnam et al. [26], childhood physical and sexual abuse variables were related to diminished self-reported mental health. Likewise, physical abuse in adolescence or adulthood was associated with poorer mental health. The associations of abuse with mental health were in all cases stronger than the associations with general health. This is consistent with literature revealing a greater prevalence of studies showing abuse, predicting mental health outcomes and stronger finding for mental health outcomes where both are predicted [11,59,60].

As expected and suggested by the literature, there were more significant relationships between childhood abuse and outcomes than adolescent or adulthood abuse, with five of seven outcomes having at least one significant childhood abuse predictor (and one additional with trend level predictors). Adulthood abuse (including adolescents from age 14) only significantly predicted three outcomes (though three more at trend level). More forms of childhood abuse were also significant, with eight significant prediction paths and four trend level paths from childhood abuse, while adolescent or adulthood abuse had only three significant relationships and four trend level relationships. Although abuse in adolescent or adulthood is detrimental, the effects of childhood abuse seem to be more pervasive and impact pain, disability, and quality of life

Table 4 Regression statistics: Abuse scales predicting post-traumatic stress disorder (PTSD) and pain disability; controlling for race, sex, and education

	Pain Disability				PTSD			
	<i>R</i> ² Δ / <i>R</i> ²	<i>F</i>	β	<i>P</i>	<i>R</i> ² Δ / <i>R</i> ²	<i>F</i>	β	<i>P</i>
All models (block 1)	0.08	4.07		0.01	0.13	6.55		0.00
Black race	—	—	0.16		—	—	0.33	
Male sex	—	—	0.03		—	—	0.07	
Education	—	—	-0.23		—	—	-0.10	
Model 1 (blocks 2 and 3)								
2. Molestation in childhood	0.02	2.48	0.13	0.12	0.00	0.00	-0.01	0.96
3. Molestation in childhood \times male	0.01	0.75	0.08	0.39	0.04	6.10	0.24	0.02
<i>R</i> ² Overall model	0.10	3.11		0.01	0.17	5.07		0.00
Model 2 (blocks 2 and 3)								
2. Molestation in adulthood	0.01	1.04	0.08	0.31	0.00	0.01	0.02	0.81
3. Molestation in adulthood \times male	0.01	1.47	0.12	0.23	0.04	5.63	0.22	0.02
<i>R</i> ² Overall model	0.10	3.08		0.01	0.17	5.08		0.00
Model 3 (blocks 2 and 3)								
2. Penetration in childhood	0.04	5.65	0.20	0.02	0.00	0.22	0.04	0.64
3. Penetration in childhood \times male	0.01	0.71	-0.10	0.40	0.01	1.21	0.13	0.27
<i>R</i> ² Overall model	0.12	3.81		0.00	0.14	4.20		0.00
Model 4 (blocks 2 and 3)								
2. Penetration in adulthood	0.03	4.46	0.17	0.04	0.00	0.02	0.01	0.88
3. Penetration in adulthood \times male	0.00	0.61	0.08	0.44	0.02	3.67	0.20	0.06
<i>R</i> ² Overall model	0.12	3.63		0.00	0.15	4.66		0.00
Model 5 (blocks 2 and 3)								
2. Physical abuse in childhood	0.01	1.76	0.11	0.19	0.00	0.20	0.04	0.65
3. Child physical abuse \times male	0.00	0.68	-0.11	0.42	0.00	0.06	0.03	0.81
<i>R</i> ² Overall model	0.10	3.06		0.01	0.13	3.87		0.00
Model 6 (blocks 2 and 3)								
2. Physical abuse in adulthood	0.01	1.73	0.11	0.19	0.00	0.10	-0.03	0.75
3. Adult physical abuse \times male	0.01	1.75	0.17	0.19	0.02	2.27	0.19	0.13
<i>R</i> ² Overall model	0.11	3.29		0.01	0.15	4.56		0.00

Bold denotes significance $P \leq 0.10$.

(mental and physical) as an adult, potentially due to central sensitization or the influences of developmental stage on behavioral responses to trauma [61].

Consistent with the literature, physical abuse was a significant predictor in some cases (two significant and three trend-level relationships); sexual abuse was more often significant (significantly related to all but sensory pain where it was related at a trend level). This study confirmed abuse patterns suggested by some of the earlier literature with CFA, with physical abuse, sexual penetration, and sexual molestation as separate factors. As suggested by the literature, it is possible that distinguishing molestation from rape may correspond to differences in severity [24]. Bendixen and colleagues [23] found a linear relationship between abuse severity and physical and psychological symptoms. The construction of the scales used was such that people who experienced more extreme abuse events in each scale, in most cases, also experienced the other abuse events within the scale. Thus, a higher score indicated higher abuse severity, and in most cases lower

scores corresponded with less severe abuse. While the questions did not allow us to assess frequency or violence of the experiences, it did allow separate examination by abuse type and the age when abuse occurred (childhood vs adolescence or adulthood).

Pain-related disability was found to be related to penetration in both adolescent or adulthood and childhood. Disability specifically related to penetration is particularly important as it may provide insights into why some people are less functional than others given similar diagnoses [54]. Additional insight may be found in the literature on abuse severity [23,24] and rape [62]. Ciccone and colleagues [24] found that fibromyalgia, a debilitating pain disorder, was three times more common in rape survivors than in the nonabused, where other sexual or physical maltreatment was not related.

While pain affects mental health, general health, and disability for both men and women, there are several findings from this study that hold only for men. Affective pain,

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miscellaneous pain, and pain-related PTSD had significant gender interactions. For sensory pain, two interactions approached significance. Consistent with Fillingim et al. [2] and Hooper and Warwick [55], it is plausible that among men, unresolved emotions related to abuse may have found a more socially accepted or less stigmatizing route to be expressed, potentially through increased pain perception or emotional response to pain. This also supports Spertus et al.'s findings that sexual abuse may be particularly problematic for men and manifest itself in stronger reactions to later incidents [10].

The most frequently encountered gender interactions occurred when sexual molestation was involved, with men showing more negative effects when molested in childhood than women or those not molested. Furthermore, this is particularly important when the outcome measure is emotionally charged as noted by Spertus et al. [10] as gender interactions indicate that men have more negative outcomes on emotionally related pain variables.

Men are less likely than women to discuss abuse based on lower spontaneous reporting and lower frequency of being asked [10,49]. Reasons for underreporting are complicated and may include attributions made or not made, if there is a physical response normally associated with pleasurable experiences (e.g., erection, ejaculation), shame in some men, or attributions of homosexuality, or embarrassment of not being "man enough" to have stopped an event [63]. This failure to report, however, may result in not receiving appropriate referrals or help for the event [63], and then manifest itself as more difficulty coping with chronic pain. It follows that if underreporting is higher among men, they are less likely to receive treatment and may not deal with the emotional distress caused by abuse until a more "societally acceptable" crisis (such as pain) arises. However, in the presence of pain, former trauma may make it more difficult to cope with pain. Little and Hamby [64] concluded that men have fewer strategies to cope with abuse than women, while finding that men are more likely to reinterpret pain symptoms [2]. Combined, these findings suggest that men with psychological impairment from abuse may interpret their pain through physical manifestations. These results further suggest the need for longitudinal research looking at attitudes, abuse reporting, and consequences to help untangle the mechanisms involved for men in particular. Additional attention should be given to sex in the training, supervision, workforce planning, and service planning areas to maximize preparative experiences for those working with sexual abuse victims to minimize potential retraumatization [55].

In conclusion, pain treatment may be less effective if the abuse history was not also considered. In order to most effectively evaluate abuse and help, measures with multiple tiers of abuse and that distinguish relationship with abuser are more likely to identify abuse and suggest treatment [65]. Thus, chronic pain treatment should also include assessment and treatment for abuse in all patients reporting an abuse history, or where the index of

suspicion for abuse is high. To improve health outcomes clinicians may need specific training. Clinician barriers (e.g., lack of time, discomfort with subject matter, and lack of familiarity with the role of abuse) may lead to failure to ask about abuse, or asking in such a way that a patient does not feel comfortable disclosing this information. McCauley et al. [66], in a study of disclosure in abused women, found that one third had discussed their abuse with a physician, 29% had been asked by a physician about abuse, and 76% said that if they had been asked they would have discussed their abuse history with their physician [8,66,67]. In reviewing the abuse disclosure literature, Havig [68] identified a wide gap, with most patients feeling that physicians should routinely ask about abuse. However, few physicians routinely asked. When comparing abused and nonabused women with depression, abused women were more likely to be receiving treatment for depression [69]. Thus, an unidentified abuse history is also a risk factor for undiagnosed or untreated depression. This highlights the critical role for clinicians in asking about abuse with every patient, including men. Ullman found that women with a social support system (formal, informal, or social support) are less likely to exhibit somatic symptoms or have poor perceptions of their health [70].

Despite our important findings, a few limitations must be noted. First, these cross-sectional data cannot confirm directional relationships. For instance, although people with mental health issues or past trauma are more likely to have found themselves in abusive relationships, the relationship between mental health and abuse may run either direction [71,72]. The data include only younger blacks and whites from a specific clinical population and may not be generalizable to other races, ages, or populations. Both self and physician selection for clinical attendance means that the group has both access and motivation to seek care for their pain, making them potentially different from the overall population.

Second, there are potential validity questions regarding retrospective and self-report data (especially for abuse) [32,73,74]. Raphael and colleagues [32] found that documented abuse was not related to increased pain; however, in the same study self-reported abuse was predictive of pain symptoms. Further exploration found that half of self-reported abuse was undocumented, while one quarter of documented abuse was unreported through self-report, suggesting underreporting and memory bias, respectively [32]. Brown et al. [75] noted that documentation is not evenhanded, with higher documentation rates among the poor and blacks in comparison with self-report information for the same populations. The most striking finding of the Raphael et al. [32] study is among documented abuse cases; those who did not self-report abuse (in spite of documented abuse) fared better on a variety of outcome symptoms. This indicates that while self-report may not be the most objective measure for whether abuse occurred, it may be the most valid for assessing when an abuse history is problematic to an individual and is likely to have a complicating role in symptomatology. The probable

underreporting of abuse (especially for men) also presents a methodological challenge and there is a need to standardize appropriate count, frequency, and multiple characteristics indexes (measures that document the invasiveness, frequency, and brutality of the abuse and the relationship of the abuser to abused) to complement the current testing strategies [76].

Third, this study did not examine the mechanisms or potential mediating and moderating effects of other constructs, such as the context in which abuse occurred. Some authors suggest that depression may explain all or most of the relationship between abuse and physical health while others did not find that controlling for depression changed the effect of abuse on various outcomes [2,75,77]. Counseling provides another potential mediator, decreasing the effects of abuse [51]. Other psychiatric diagnoses also add to the meaning of these findings, and although the current database did not include such diagnoses, future studies should do so. Ciccone et al. [24] suggest that PTSD acts as the mediator. Although there was a PTSD measure in this data set, it was related strictly to the pain event and not earlier life events. Thus, a PTSD measure that carefully documents cause and examines abuse-related PTSD as a mediator is critically important. Several authors note that abuse happens within certain contexts and that those contexts have a negative effect on health, confounding any questions of the impact of abuse [17,78]. Likewise, environmental or genetic factors may act as moderators for risk and resiliency [79], altering the influence abuse has on the chronic pain experience. However, the presence of abuse still provides a powerful diagnostic tool to discovering whether there are other health issues that need to be addressed that may manifest in later health problems [13]. Small samples (particularly men) may have prevented the ability to see more significant results. The similar direction for many nonsignificant relationships suggests that with a larger sample, these relationships may become significant.

Finally, the instrument used does not distinguish between abuse in adulthood and abuse in adolescence, which could have added additional insight [80]. In the pain literature, however, there has been a failure to compare even childhood with adolescence and adulthood, so the contribution made with this study is significant.

Overall, this study adds to the literature by showing that abuse impacts both men and women with chronic pain in several ways. In addition, it is particularly important in that it addresses a gap in the literature as it relates to men. Higher abuse rates were confirmed in a chronic pain population than among the community in general. It is important to note that an abuse history was poorly assessed or addressed during prior clinical or primary care visits, thereby clarifying the importance of addressing abuse-related issues in tertiary care settings. Also, the negative effects of abuse were strong and in some cases stronger for men than for women, highlighting the importance of including men when addressing abuse questions. As abuse is more common in blacks than in whites, this is

especially important for black men. These findings also clarify that abuse and the age when abuse occurs may alter its manifestation in a chronic pain population. These results support the need to screen all chronic pain patients for abuse regardless of race, age, or gender while confirming the importance of pursuing appropriate treatment options to improve overall health and well-being.

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