Are Reports of Childhood Abuse Related to the Experience of Chronic Pain in Adulthood?

A Meta-analytic Review of the Literature

Debra A. Davis, MA, Linda J. Luecken, PhD, and Alex J. Zautra, PhD

Background: Recent empirical evidence suggests that childhood abuse may be related to the experience of chronic pain in adulthood. To date, a systematic quantitative review of the literature has not been presented.

Objectives: The purpose of this study was to use meta-analytic procedures to evaluate the strength of existing evidence of the association between self-reports of childhood abuse and the experience of chronic pain in adulthood.

Methods: Analyses were designed to test the relationship across several relevant criteria with 4 separate meta-analyses.

Results: Results of the analyses are as follows: 1) individuals who reported being abused or neglected in childhood also reported more pain symptoms and related conditions than those not abused or neglected in childhood; 2) patients with chronic pain were more likely to report having been abused or neglected in childhood than healthy controls; 3) patients with chronic pain were more likely to report having been abused or neglected in childhood than nonpatients with chronic pain identified from the community; and 4) individuals from the community reporting pain were more likely to report having been abused or neglected than individuals from the community not reporting pain.

Conclusion: Results provide evidence that individuals who report abusive or neglectful childhood experiences are at increased risk of experiencing chronic pain in adulthood relative to individuals not reporting abuse or neglect in childhood.

Key Words: child abuse, neglect, chronic pain

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Early life exposure to abusive treatment may represent a contributing factor to the development of chronic pain disorders in adulthood. Researchers examining this issue over the past decade have found that individuals reporting a history of childhood abuse also report greater pain and headaches,[1–4] gastrointestinal and respiratory symptoms,[1,2,5] gynecologic problems,[1,3] neurologic symptoms, overall physical problems,[5] and visits to health professionals compared to individuals who do not report a history of childhood abuse.[2,3,6] Similarly, individuals reporting greater symptom severity, increased medical utilization, and more surgical procedures also tend to report higher than normal prevalence rates of childhood abuse.[7]

A number of pathways have been proposed to explain the link between reports of childhood abuse and the experience of chronic pain in adulthood. Abusive childhood experiences are associated with the development of poor health behaviors and negative psychosocial characteristics, both of which are associated with an increased risk of physical disorders.[8,9] Childhood abuse is associated with severe deficiencies in the ability to effectively self-regulate emotion,[9] resulting in inappropriate perceptions of threat and exaggerated fight-or-flight responses.[10] Early abuse is associated with a higher risk of exposure to relationship violence and life stress.[11,12] Heim and Nemeroff found that childhood abuse survivors reported more adult traumas and demonstrated greater neuroendocrine stress reactivity, suggesting physiological sensitization to stress and increased vulnerability to stress-related illnesses.[13] In short, disturbances in emotional, behavioral, physiological, and/or social functioning resulting from adverse childhood experiences represent contributing factors to the experience of chronic pain in adulthood and are likely to act as significant barriers to recovery.

These research findings provide evidence for the existence of a link between exposure to childhood maltreatment and the occurrence of chronic pain in adulthood, and they provide theoretical support for plausible underlying mechanisms that might drive the relationship. A methodological concern within this body of literature has been the frequent use of clinical samples. Because individuals seeking healthcare might be more likely to report pain symptoms compared with individuals not seeking healthcare, a reporting bias could influence the findings. Given that the relationship of childhood abuse to reports of pain symptoms might be exaggerated in patients because of this influence, an examination of the relationship in nonpatient samples would aid in determining the extent of the effect. Furthermore, comparing the effect sizes of the abuse/pain relationships in patients to the effect sizes of the abuse/pain relationship in nonpatients would contribute to further understanding of the role that reporting biases play when utilizing clinical samples. Another related concern is that studies might be biased by a focus on convenience-based

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From the Department of Psychology, Arizona State University, Tempe, AZ.
Reprints: Linda J. Luecken, PhD, Box 871104, Arizona State University, Tempe, AZ 85287-1104 (e-mail: Luecken@asu.edu).

rather than population-based samples. These concerns, along with null findings from other studies, suggest that it would be valuable to use quantitative methods to evaluate the existence and magnitude of the relationship between reports of childhood abuse and the experience of chronic pain in adulthood. A positive relationship between reports of childhood abuse and the experience of pain would suggest that interventions targeted at the sequelae of abuse might benefit an individual's experience with chronic pain. Alternatively, a null finding would suggest that reports of early abusive relationships are not likely to significantly impact the experience of chronic pain and may not be a useful target for intervention.

Although chronic pain has been declared "the next frontier in child maltreatment research,"[14] to date, a quantitative review of the existing research has not been available. The purpose of the current study is to use meta-analytic procedures to investigate whether chronic pain in adulthood is significantly associated with self-reports of childhood exposure to physical or sexual abuse or neglect. Because the great majority of existing research has been retrospective, and there are reasons to believe the relationship may differ in prospective versus retrospective studies, the current study specifically focuses on the relationship between retrospective reports of childhood abuse and the experience of chronic pain in adulthood. Analyses were designed to systematically evaluate, through a series of important group comparisons, if self-reported abusive childhood experiences are associated with greater reports of pain in adulthood. In doing so, these analyses address the relationship from a number of perspectives, including the frequency of reports of pain in individuals who report abuse, the frequency of reports of abuse in patients with chronic pain, the influence of patient status in the relationship, and the strength of the relationship within community-derived samples. It was hypothesized that reports of childhood exposure to abusive treatment would be associated with increased reports of chronic pain in adulthood and that this relationship would not be limited to those seeking treatment of chronic pain.

METHOD

Literature Search

All studies chosen for the meta-analyses included retrospective reports of neglect, sexual or physical abuse experienced during childhood, and a measure of pain symptoms, chronic pain disorder status, or health care visits. A variety of samples were included in the meta-analysis, and consisted of patients with chronic pain, nonpatients with chronic pain who met American College of Rheumatology (ACR) criteria for fibromyalgia syndrome but had never been treated for their pain condition, healthy controls, and individuals recruited from the community who reported pain symptoms. Studies were selected only if they included an appropriate comparison group. Searches of PubMed, MEDLINE, and PsycINFO were used to locate these articles. Keywords used in the searches were "chronic pain" and "child abuse" and "neglect." Although it is acknowledged that definitions vary among studies, the authors' definitions of "abuse" and "neglect" used in the studies were accepted for the purposes of these analyses. Sixteen different studies met the inclusion requirements and are identified in the *Appendix*. Because several studies included more than 1 comparison group, 21 meta-analytic group comparisons were derived from the selected studies.

Description of Studies

Publication dates ranged from 1990 to 2001. Total sample size for the 16 studies was 5299 (mean = 264, SD = 372, median = 107). Sample sizes ranged from 40 to 1263 participants. Seven studies ranged from 40 to 100, 5 from 104 to 289, and 4 from 426 to 1263. Of the 16 studies, 6 included only females and the remaining 10 included females and males. Overall, there were 3357 females and 1942 males.

Comparisons

There were 4 basic questions to address in the meta-analyses; however, not all studies were designed to address these questions. Studies investigating the relationship between reports of childhood abuse and chronic pain are by nature heterogeneous. Therefore, the 16 studies identified in the literature search were clustered to address the research questions according to which types of group were compared and which dependent variables were selected for measurement. The following questions were tested:

1. Are individuals who report the experience of abuse or neglect in childhood more likely to report pain symptoms or conditions than individuals from a matched comparison group who do not report abuse or neglect during childhood?
2. Are patients with chronic pain more likely to report having been abused or neglected in childhood than healthy controls?
3. Are patients with chronic pain more likely to report having been abused or neglected in childhood than nonpatients with chronic pain?
4. In population-derived samples, are individuals who report pain more likely to also report having been abused or neglected in childhood than those who do not report pain?

Separate meta-analyses were performed to test each of these questions. The comparisons across different types of study groups were made to delineate underlying mechanisms supporting the relationship, to determine the extent of the relationship in a larger, more generalizable sample, and to help decrease the possibility of third variable problems.

Meta-analytic Procedures

Kenny's Meta-analysis, Easy to Answer program (META) was used to perform the meta-analytic procedures. Using META, effect sizes were computed for each study and then weighted according to sample size. Effect sizes were weighted to incorporate a measure of differing amounts of statistical power among studies into the meta-analytic calculations. The weighted effect sizes were pooled, and the combined probability that the average effect size among studies was different from zero was computed using 2-tailed P values.[15]

For each collection of studies and corresponding meta-analysis, both fixed- and random-effects meta-analytic procedures were used to determine types of inferences appropriately used according to the summary parameters of effect sizes. Traditionally, fixed-effects models have been used in

conjunction with homogeneous effect parameters, whereas random-effects models have been used when effect sizes across studies have been found to be heterogeneous.[16] Therefore, even though both fixed- and random-effects models were calculated in these observations, homogeneity of variance between and within studies also was calculated and tested using the χ^2 distribution to distinguish which procedure would be most appropriate for interpretation of the meta-analytic results. When effect sizes across studies were heterogeneous, emphasis was placed on the random effects model for interpretation of results. When effect sizes across studies were homogeneous, emphasis was placed on the fixed-effects model for interpretation of results.[17]

Finally, in those meta-analyses that resulted in a significant overall effect, a File-Drawer analysis was performed using the Fail-safe N procedure. Rosenthal[18] recommended a File-Drawer analysis to account for possible publication bias, given that smaller studies with null results are more likely to remain unpublished in investigators' file drawers than larger studies with positive results. The Fail-safe N is a mathematical method that determines the number of studies with null results that would have to be published to reduce the probability of type I error to nonsignificance. Larger Fail-safe N statistics indicate more stable meta-analytic results.

On another note, regarding fixed- versus random-effects procedures for meta-analysis, it should be acknowledged that considerable confusion exists among researchers regarding the differences and appropriate uses between the 2 statistical models. Because it is not within the scope of this paper to clarify this confusion, the reader is referred to the excellent evaluation, clear descriptions, and indications for appropriate use of the procedures provided by Hedges and Vevea.[17]

RESULTS

Question 1: Are Individuals Who Reported Abuse or Neglect in Childhood Likely to Report More Pain Symptoms Than Individuals From a Matched Comparison Group Who Do Not Report Abuse or Neglect?

Nine studies (total N = 3040) examined the question of whether reports of childhood abuse or neglect increase the risk of adult pain conditions (Table 1). These studies compared reports of pain symptoms in individuals who reported being abused or neglected in childhood to reports of pain symptoms in those not reporting abuse or neglect. Samples used in these studies were recruited from a variety of populations. Three studies used community-based samples. Four studies used outpatients from multidisciplinary pain clinics, rheumatology clinics, or psychiatric clinics. Effect sizes (Cohen d) among these studies ranged from 0.1251 to 1.047. The mean effect size across these studies was 0.4076 ± 0.27. The META produced a weighted (square root of N) mean effect size of 0.3287 ± 0.18. Using the more conservative random effects model, this effect size was significantly different from zero ($t = 5.5267$, $P = 0.0006$) with a Fail-safe N of 63 studies. Using

TABLE 1. Studies Comparing Pain Reports Between Abused and Nonabused Individuals

Study*	Sample	Childhood Abuse Group	Comparison Group(s) (nonabused)	Dependent Variable	Effect Size (cohen d)	Weight (square root of N)
Raphael, et al[11]	Community	743 individuals with retrospective reports of abuse or neglect during childhood	520 individuals with no documented history of abuse	Pain symptom counts	0.2213	35.5387
Finestone, et al[5]	Psychiatric patients and nurses	26 group attendees for the treatment of childhood sexual abuse	33 psychiatric outpatients reporting no history of abuse and 21 hospital nurses	Pain symptoms lasting more than 3 mos	0.5379	8.9443
Green, et al[7]	Multidisciplinary pain center patients	43 individuals with retrospective reports of sexual and/or physical abuse	61 individuals reporting no history of abuse	Pain complaints	0.4395	10.1980
Fillingim, et al[4]	Community (college women)	119 women who reported a positive history of childhood abuse	156 women reporting no history of abuse	Muscle pain	0.1251	16.5831
Fillingim, et al[4]	Community (college men)	36 men who reported a positive history of abuse	115 men reporting no history of abuse	Muscle pain	0.2664	12.2882
Toomey, et al[14]	Patients with chronic pain	22 reporting a history of abuse	58 not reporting a history of abuse	Pain symptom counts	0.2277	0.89443
Alexander, et al[2]	75 patients with FM	43 reporting a history of abuse	32 not reporting a history of abuse	Pain symptom counts	0.4731	8.6603
Taylor, et al[13]	Patients with FM	26 reporting a history of abuse	14 not reporting a history of abuse	Pain symptom counts	1.047	6.3245
Bendixen, et al[3]	Community (male and female college students)	116 reporting a history of abuse	856 not reporting a history of abuse	Headache, muscular, and abdominal pain symptoms	0.3307	31.1769

*Please see Appendix for reference citations.

the fixed effects model, the test of effect size also was significant (average z = 6.5689, $P < 0.0001$), with a Fail-safe N of 93. The results of the χ^2 distribution to test for homogeneity of effect sizes indicated that standardized mean differences of pain complaints between the 2 groups (abused versus nonabused) were consistent across the 9 studies in spite of the heterogeneous nature of sample sources. These results provide evidence that individuals abused or neglected in childhood are likely to experience more pain symptoms in adulthood relative to individuals not abused or neglected during childhood. Furthermore, based on the significance of the results using the random effects model, these results can be generalized to the populations represented by the samples. Please see Table 2 for a summary of findings.

Question 2: Are Patients With Chronic Pain More Likely to Report Having Been Abused or Neglected in Childhood Than Healthy Controls?

Eight studies (total N = 1811) compared reports of abuse histories in patients with chronic pain to those in healthy comparison groups (Table 3). Patients with chronic pain were recruited from several types of clinics for these studies. Two studies recruited outpatients from chronic pain clinics. Four studies recruited patients with chronic pelvic pain from gynecology clinics, and 2 studies recruited patients with fibromyalgia syndrome from rheumatology clinics. Individuals used as healthy comparisons were recruited from community respondents, hospital employees, patients visiting their general practitioners or gynecologists for routine check-ups, and patients seeing their gynecologists for elective procedures such as tubal ligations or infertility.

The effect size used in this analysis was the proportion of healthy controls reporting a history of abuse or neglect in childhood subtracted from the proportion of patients with chronic pain reporting a history of abuse or neglect in childhood. Effect sizes ranged from 0.071 to 0.3390. The mean effect size across studies was 0.2235 ± 0.1006. The META weighted mean effect size was 0.1892 ± 0.08. The test of effect size using the random effects approach was significant ($t = 6.8982$, $P = 0.0003$) and would require a minimum of 92 studies with null results to render it nonsignificant. The test of effect size using the fixed effects approach was significant (z = 5.9763, $P < 0.0001$) and would require a Fail-safe N of 67 studies with null results to render it nonsignificant. The χ^2 distribution to test for homogeneity of effect sizes across studies indicated that effect sizes were not homogeneous ($Q_{between} = 18.0068$, $P = 0.012$). This result indicates that unspecified subgroup or categorical differences might exist between studies, which in turn would cause the variation among effect sizes. Indeed, sample sources vary widely between these particular studies. However, the fact that the more stringent random effects test is significant in spite of these variations provides modest support for the hypothesis that patients with chronic pain are more likely to have experienced a history of abuse or neglect during childhood than healthy controls.

Question 3: Are Patients With Chronic Pain More Likely to Report Having Been Abused or Neglected in Childhood Than Nonpatients With Chronic Pain?

Two studies (total N = 522) compared reports of childhood abuse histories in individuals who had sought treatment of their chronic pain to individuals who reported a significant amount of pain but never had sought treatment of their condition (Table 4). One study compared patients from a rheumatology clinic diagnosed with fibromyalgia syndrome to community respondents who met ACR criteria for fibromyalgia syndrome who had not sought medical care for their condition. The other study compared patients with chronic pain consecutively visiting a multidisciplinary clinic to community respondents reporting "pronounced pain" who never had sought treatment of their condition (nonpatients).

Effect size was derived by subtracting the proportion of nonpatients with chronic pain reporting a history of abuse or neglect in childhood from the proportion of patients with chronic pain reporting a history of abuse or neglect in childhood. Effect sizes of the 2 studies were 0.1800 and 0.1180, respectively. The META weighted mean effect size was 0.1482 ± 0.03. The test of random effects was not significant ($t = 6.4855$, $P = 0.1702$). The test of fixed effects was significant (z = 3.0026, $P = 0.0027$) with a Fail-safe N of 3. Effect sizes were homogeneous across studies ($Q_{between} = 0.432$, $P = 0.8058$). The significant fixed effects test indicates that in these 2 studies, patients with chronic pain were more likely to report a history of abuse or neglect than nonpatients with chronic pain. The less than significant random effects test

TABLE 2. Summary of Results: Quantitative Meta-Analyses

Study Classification by Group (DV)	Study N	Patient N	Random Effects Approach Effect Size (SD)	*t* test	Random Effects Approach Fail-Safe N	Homogeneity of Effect Size (χ^2)	Fixed Effects Approach Average Z	Fixed Effects Approach Fail-Safe N
Abused vs. nonabused (pain symptoms)	9	3040	Cohen d 0.3287 (0.18)	5.5267 ($P = 0.0006$)	63	10.0901 ($P = 0.2588$)	6.5689 ($P < 0.0001$)	93
Patients with chronic pain vs. controls (abuse group)	8	1811	p1–p2 0.1892 (0.08)	6.8982 ($P = 0.0003$)	92	18.0068 ($P = 0.012$)	5.9763 ($P < 0.0001$)	67
Patients with chronic pain vs. non patients with chronic pain (abuse group)	2	522	p1–p2 0.1482 (0.03)	6.4855 ($P = 0.1702$)	Not applicable	0.1975 ($P = 0.6567$)	3.0026 ($P < 0.00268$)	3
Community respondents pain reporters vs. pain nonreporters (abuse group)	2	968	p1–p2 0.1203 (0.07)	2.4447 ($P = 0.3244$)	Not applicable	1.3511 ($P = 0.2451$)	3.8913 ($P < 0.0001$)	6

TABLE 3. Studies Comparing Reports of Abuse Between Patients With Chronic Pain and Healthy Controls

Study*	Description of Sample	Patients With CP	Healthy Controls	Dependent Variable: Classification	Effect Size (difference between proportions)	Weight (square root of N)
Goldberg and Goldstein[6]	CP outpatients and hospital employees	92 outpatients (rehabilitation)	98 hospital employees	Childhood abuse history (sexual, physical verbal)	0.3300	13.7840
Lampe, et al[8]	Chronic pelvic pain and general practitioner patients	36 consecutive gynecological patients with chronic pelvic pain	20 patients seeing a GP	Physical abuse experienced in childhood	0.3390	7.4833
Alexander, et al[2]	Rheumatology clinic patients and community respondents (newspaper ad)	75 outpatients (rheumatology clinic, FM)	48 community respondents	Sexual and/or physical abuse experienced in childhood	0.1820	11.0905
Linton[9]	CP outpatients and community respondents (bulk mail)	142 outpatients (rehabilitation)	945 community respondents	Sexual and/or physical abuse experienced in childhood	0.0710	32.9697
Taylor, et al[13]	Rheumatology clinic and community recruits (referral, etc.)	40 patients with fibromyalgia syndrome	42 community recruits (no pain)	Sexual abuse experienced in childhood	0.1300	9.0554
Walling, et al[16]	Chronic pelvic pain clinic and gynecology patients	64 patients with chronic pelvic pain	46 pain-free women	Sexual abuse experienced in childhood	0.1600	10.4881
Rapkin, et al[12]	Rheumatology clinic and community	31 patients with chronic pelvic pain	32 community recruits (no pain)	Physical abuse experienced in childhood	0.2960	7.9373
Walker, et al[15]	100 patients, laparoscopic evaluation	50 patients with chronic pelvic pain	50 ob/gyn patients (tubal ligation or infertility)	Childhood sexual abuse	0.2800	10.000

*Please see Appendix for reference citations.
CP, chronic pain; GP, general practitioner.

and the small Fail-safe N indicate that these results are not likely to be stable and should not be generalized to the population.

Question 4: In Population-Derived Samples, Are Individuals Who Reported Pain More Likely to Report Having Been Abused or Neglected in Childhood Than Those Who Did Not Report Pain?

Two studies (total N = 484) met criteria for this analysis (Table 5). One study recruited individuals from a general medical practice register who had demonstrated at least some psychologic distress (General Health Questionnaire [GHQ] ≥2). The other study recruited individuals from bulk mailings.

Effect sizes (difference between proportions) were 0.09 and 0.14, respectively. Mean effect size was 0.115 ± 0.04. The META weighted mean effect size was 0.1203 ± 0.07. The random effects test was nonsignificant (t =2.4447, P = 0.3244) due to low number of studies. The fixed effects test was significant (z = 3.8913, P = 0.0001) with a Fail-safe N of 6. These results indicate that, in individuals who participated,

TABLE 4. Description of Studies Comparing Reports of Abuse Between Patients With Chronic Pain and Nonpatients With Chronic Pain

Study*	Description of Sample	Patients With Chronic Pain	Nonpatients With Chronic Pain	Dependent Variable: Classification of Abuse	Effect Size (difference between proportions)	Weight (square root of N)
Aaron, et al[1]	Rheumatology clinic patients and community residents	80 patients with fibromyalgia (male and female)	33 nonpatients from community meeting ACR criteria for fibromyalgia	Childhood physical and/or sexual abuse	0.1800	10.6301
Linton[9]	Chronic pain clinic patients and community respondents	142 patients with chronic musculoskeletal pain (male and female)	267 nonpatients reporting pronounced pain	Childhood physical and/or sexual abuse	0.1180	20.2237

*Please see Appendix for reference citations.

TABLE 5. Community-Based Studies Comparing Reports of Abuse Between Individuals Reporting Pain Versus Individuals not Reporting Pain

Study*	Description of Sample	Community-Based Pain Group	Community-Based Nonpain Group	Dependent Variable: Classification of Abuse	Effect Size (difference between proportions)	Weight (square root of N)
McBeth, et al[10]	Community-based from a general practice register, all had demonstrated psychological distress	99 individuals with tender points ≥5	190 individuals with tender points <5	Physical and/or sexual abuse	0.0900	17.000
Linton[9]	Community respondents to bulk mailing soliciting study recruits	267 individuals reporting "pronounced pain"	412 individuals reporting "no pain"	Physical and/or sexual abuse	0.1400	26.056

*Please see Appendix for reference citations.

those who reported pain were more likely to report having been abused or neglected in childhood than those who did not report pain.

DISCUSSION

The purpose of this study was to use meta-analytic procedures to evaluate whether reports of abusive treatment in childhood elevate the risk of experiencing chronic pain in adulthood. The analyses addressed some of the key methodological concerns in the existing literature, such as the sampling of heterogeneous populations and the use of less than optimal comparison groups. Effect size estimates of the relationship between pain and abuse were modest but significant across all group comparisons. The first comparison indicated that individuals reporting childhood abuse or neglect reported more pain symptoms than individuals not reporting histories of childhood abuse or neglect. These findings support prior research indicating that women abused as children tend to report more physical problems compared to nonabused comparison groups.[1,2] The results of the meta-analysis indicate that the effect is stable across a wide variety of samples and can be generalized beyond the samples to their populations. However, because the majority of study participants were women, these results may not generalize to men reporting childhood abuse histories.

The second meta-analysis indicated that patients with chronic pain are more likely to report a history of abuse than healthy individuals. As in the first analysis, the results indicate that the effect is stable across a wide variety of samples and can be generalized beyond the samples to their respective populations.

The third meta-analysis indicated that patients with chronic pain were more likely to report a history of abuse compared to nonpatients were identified to be suffering from chronic pain and were recruited from the community. In short, patients and nonpatients with very similar chronic pain issues differed in their reports of childhood abuse histories. These results suggest that patient status may contribute to the positive relationships observed between reports of childhood abuse and experiences of chronic pain in adulthood. On the other hand, an underreporting bias in the nonpatients could account for the differing findings. Just as characteristics unique to health care-seeking individuals might cause them to disclose more than nonpatients, characteristics unique to this sample of nonpatients with significant chronic pain disorders may have caused them to disclose less, resulting in less reports of childhood abuse. In support of this explanation is the fact that the random effects analysis was not significant, indicating the results should not be generalized beyond the samples from which they were obtained.

The final meta-analysis indicated that individuals recruited from the community who reported more pain symptoms and conditions were also more likely to report a history of abuse or neglect relative compared to those who reported less pain symptoms and conditions. These results suggest that the relationship between childhood abuse or neglect and pain in adulthood is not limited to clinical samples of individuals seeking care for their pain condition. In combination, results from all the meta-analyses support the hypothesis that reports of exposure to abuse or neglect in childhood are associated with greater reports of chronic pain in adulthood.

As described previously, there are several pathways by which adverse childhood experiences might affect the experience of chronic pain in adulthood. These include emotional, physiological, psychosocial, and behavioral factors. Psychologic factors in particular may be a strong influence in the relationship between reports of early abuse and the experience of pain in adulthood. One explanation for the findings of this meta-analysis is that reports of abuse in childhood are linked with negative current life factors, including psychologic distress, poor health behaviors, and abusive social relationships, and these factors may then be strongly linked to the experience of pain symptoms. Because of the heterogeneity of the studies, this meta-analysis cannot make any conclusions about the impact of factors such as psychologic distress or current relationship violence. However, the goal of the meta-analysis was to address the basic question of whether or not a relationship exists between reports of child abuse and the experience of chronic pain in adulthood, above and beyond the potential effect of a reporting bias of a patient population. Our analyses demonstrate that a modest relationship exists, but a number of questions remain regarding the precise nature of the relationship, including the age at which the abuse occurred,

gender differences in the effects, impact of current distress, type of abuse or neglect, and the implications of self-report versus documented abuse.

Methodological Considerations

A primary limitation to studies of the relationship of child abuse to chronic pain in adulthood is the frequent reliance on retrospective self-reports of exposure to abuse in childhood, the validity of which cannot be verified. An exception to this trend is a prospectively designed study by Raphael et al comparing pain complaints of adults with court-documented abuse to pain complaints of adults without court-documented abuse.[19] In contrast to the studies relying on retrospective self-reports, this investigation failed to find a relationship between court-documented exposure to childhood abuse and increased pain symptoms or development of chronic pain in adulthood. However, the actual occurrence of childhood abuse in the general population is much higher than is handled through the legal system, and there are likely to be considerable differences in the experiences and consequences for those with court-documented abuse versus those who later self-report abusive childhood experiences. The discrepancy between findings of retrospective versus prospective studies suggests that the perceptions and/or interpretations of the victims regarding their abusive early experiences might play an important role in their reported experiences of adulthood chronic pain. On the other hand, records of court-documented abuse would not capture these personal experiences.

Another possibility for the null findings is the classification of individuals with undocumented (but self-reported) abuse to the control group. The inclusion of these individuals into the control group might have attenuated differences between the control group and the group with the court documented abuse history. In response to this concern, Raphael et al compared individuals with or without welfare histories and found that pain complaints were "virtually identical" between groups. They concluded that misclassification error probably did not affect the results of their study. However, in contrast to the results of the prospectively designed portion of their study and similar to the results of other retrospective studies, differences in pain complaints were found between adults with retrospective, self-reported accounts of childhood abuse relative to those who did not report abuse. A number of further comparisons could provide useful information addressing these issues, including a comparison of those with documented abuse to a control group, which excludes those with positive self-reported histories of abuse. Alternatively, it would be interesting to compare those with self-reported abuse to those with court-documented abuse. Because of the secrecy that often accompanies abuse or neglect and the large number of undocumented cases of abuse, the reliance on documented cases can result in a different set of validity problems than the reliance on self-reported cases of abuse. For these reasons, both self-reports and documented cases of abuse provide useful information about the long-term consequences of childhood maltreatment.

In any event, the accuracy of self-reports remains a concern to many researchers. Brewin et al[20] conducted a review of literature addressing retrospective reports and concluded there is little evidence that such reports are inherently inaccurate, even among those experiencing current psychopathological symptoms. Others have shown that in adults, memory is enhanced for emotional versus neutral stimuli, suggesting that recall of highly emotional childhood experiences like abuse will be enhanced relative to neutral experiences.[21] Bifulco et al[22] provide further support for the reliability of retrospective reports of abuse. Their Childhood Experience of Care and Abuse interview has shown good reliability and validity with adults and has shown good reliability between sibling accounts.[23] Although these findings suggest that recall bias does not play a substantial role in the relationship between childhood abuse and chronic pain in adulthood, the accuracy of reports of sexual abuse in particular has been the subject of considerable controversy within the literature. Although some lines of research suggest that recall of childhood abuse can be disrupted or repressed, others suggest that false memories of abuse can be created. In light of the continuing controversy, perhaps the best conclusion to be drawn from the current findings is that interpretations or memories of childhood abuse are associated with higher occurrence of chronic pain in adulthood.

One limitation of this area of research in general that in turn limits the meta-analyses is the considerable variability in the operational definitions of "child abuse and neglect" across the studies included in the analyses. The negative test results of heterogeneity of variance in the meta-analysis point to the validity of the current findings; however, there are clearly factors that may exacerbate or ameliorate the relationship. Potential moderators of the relationship that might drive treatment considerations include the severity and type of abuse or neglect, the age at which the abuse or neglect occurred, the presence or absence of early intervention, objective validation of abusive treatment, and the presence of current abusive relationships. More consistency in the definition of abuse would allow for a better test of the relationship to chronic pain in adulthood. In addition, specific definitions of abuse and a better understanding of moderators of the long-term impact would allow for more effective, targeted interventions. Similarly, the variability of outcome measures used across relevant studies limits the conclusions to be drawn from the meta-analyses. However, the null results of tests of heterogeneity of variance in the meta-analysis argue against the likelihood that the difference in outcome measures affected the overall results of the analyses. Furthermore, a reduction in variability of outcome measures likely would increase the power to detect differences, enhancing the positive results of this study.

Finally, the effect sizes found in these meta-analyses were mainly in the small range according to Cohen's criteria.[24] The largest effect size, 0.33, was found in the comparison of pain symptoms between abused and nonabused groups. Based on the results of these analyses, the overall relationship between childhood abuse and adult chronic pain conditions appears to be significant, but relatively modest. It will be important in future research to more clearly identify the chronic pain outcomes most closely associated with adverse early childhoods and the specific childhood experiences most closely linked to the development of chronic pain.

CONCLUSIONS

The combined results of these quantitative meta-analyses provide support for the idea that chronic pain in adulthood and reports of childhood abuse or neglect are related above and beyond their shared variance with patient status or recall bias. The results support the growing emphasis on a biopsychosocial approach in the treatment and understanding of chronic pain by suggesting that the consequences of abusive early treatment may be contributing to the experience of pain. Psychotherapeutic approaches that address the sequelae of childhood abuse may have the potential to benefit psychologic well-being as well as physical functioning in patients experiencing chronic pain. Further research with the goal of delineating the nature of the relationship between childhood abuse and chronic pain in adulthood has considerable potential to enhance treatment success in terms of chronic pain outcomes. Furthermore, a thorough investigation of the mechanisms underlying this relationship will allow for the understanding of other important biopsychosocial effects on health outcomes. Given the results of the meta-analyses presented in this report, it appears that pioneering efforts in this "new frontier of childhood maltreatment research"[14] are producing important information useful in the understanding of the contribution of adverse childhood experiences to the experience of chronic pain in adulthood.

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APPENDIX

A. Table References

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