Change in Suicidal Ideation Following Interdisciplinary Treatment of Chronic Pain

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Abstract

Objectives—To examine suicidal ideation in individuals with chronic pain, especially change in suicidal thinking following interdisciplinary treatment.

Methods—Consecutive patients (n = 250) admitted to a 4-week, group-based chronic pain management program completed measures of pain intensity, functional limitations, depressive symptoms, overall distress, pain catastrophizing, self-perceived burden, and suicidal ideation at pre- and post-treatment.

Results—Before treatment, 30 (12.0%) participants were classified as having a high level of suicidal ideation, 56 (22.4%) had a low level of suicidal ideation, and 164 (65.6%) reported none. Following treatment, there was a significant reduction in suicidal ideation and improvements in all other outcomes, but there were still some individuals with high (n = 22, 8.8%) or low (n = 28, 11.2%) levels at discharge. Patients with high suicidal ideation at baseline differed from those with no suicidal thinking on pre- and post-treatment measures of depression, distress, catastrophizing, and self-perceived burden, but not on pain intensity or functional limitations. Patients high in suicidal ideation endorsed greater pain catastrophizing and self-perceived burden than those low in suicidal thinking. Sustained suicidal ideation after treatment was associated with higher baseline levels of suicidal thinking and self-perceived burden to others, as well as a more limited overall response to treatment.

Discussion—Suicidal ideation was common in individuals with chronic pain, although mostly at a low level. Interdisciplinary treatment may result in reduced suicidal thinking; however, some

patients continue to express thoughts of self-harm. Future studies could examine processes of change and interventions for treatment-resistant suicidal concerns.

Keywords

suicidal ideation; chronic pain; interdisciplinary treatment; treatment outcomes

Introduction

It is estimated that individuals with chronic pain have a suicide rate at least 2–3 times higher than the general population.^{1,2} Several longitudinal epidemiologic investigations have demonstrated significant positive associations between pain conditions and completed suicides.^{3–6} Case control studies of pre-morbid pain among suicide victims^{7,8} and prospective case series studies of pain clinic or rheumatology patients^{9–11} have also indicated that those with chronic pain have an increased risk of completed suicide.

Another approach to the study of suicide in chronic pain has been to investigate the occurrence of suicidal ideation (SI) among people with pain-related problems. Although only a small percentage of those who contemplate suicide go on to complete it, there is a continuum of risk, ranging from passive thoughts of death to lethal suicide attempts, that makes SI a relevant warning sign.^{12–14} Indeed, several epidemiologic studies have confirmed that both SI and suicide attempts are elevated among community residents with chronic pain.^{15–21}

A third line of research has investigated SI among patients who are seeking treatment for pain. Studies of this type indicate that it is relatively common for people with chronic pain to think about suicide. Depending on the study sample and method of assessment, at least passive thoughts of death or suicide have been reported by 14.1% to 41.5% of pain clinic attenders,^{22–30} whereas more active SI has been expressed by 1.2% to 16.6%.^{22,23,27,28,31}

Among the more consistent individual correlates of SI (i.e., variables that have been identified in more than a single study) are previous suicide attempts,^{24,25} longer pain duration,^{31,32} depressive symptoms,^{23,26,28–30,32} pain catastrophizing,^{23,25,32} pain-related interference with activities,^{23,25} low use of coping self-statements,^{23,25} and the sense that one has become a burden to others.^{26,32,33} In some studies,^{23,25,29} but not all,^{26,28,32} SI has also been associated with greater pain intensity. Some of these risk factors represent historical facts that cannot be changed; however, others are potentially modifiable with appropriate intervention.

Interdisciplinary rehabilitation is recognized as an effective approach for the management of chronic pain, providing beneficial outcomes in several areas related to SI, including pain intensity, functional limitations, pain catastrophizing, and depressed mood.^{34–40} As yet, no studies have specifically investigated the extent to which treatment for chronic pain affects SI itself. Reductions in SI could be an important outcome for pain management programs, indicating improvement in a neglected aspect of distress and, perhaps, contributing to a reduction in suicide attempts and completed suicides. In this study, therefore, we examined: (1) the prevalence of SI among patients attending an interdisciplinary rehabilitation program

for chronic pain; (2) whether SI decreases following interdisciplinary treatment; (3) baseline and post-treatment differences among patients with varying degrees of SI; and (4) the clinically important problem of sustained SI following treatment.

Materials and Methods

Participants and procedure

The current study was embedded within a broader research program examining psychosocial aspects of chronic pain.^{32,33} Participants were consecutive patients admitted to an interdisciplinary, outpatient, group-based chronic pain self-management program. Services were offered at a publically-funded rehabilitation hospital. All participants completed a battery of psychometric questionnaires at program admission and at discharge, which provided the data for the present study. Ethical approval for this research was obtained from the institution's research ethics board. All participants provided written informed consent.

Chronic pain management program

The overarching objective of the program was to help patients better manage chronic pain by providing education about pain and disability, teaching adaptive coping strategies, and addressing factors associated with pain and functional limitations.

Patients referred to the program were initially triaged by a nurse clinician. They then attended an information session that described the program and its self-management philosophy. Patients with a continuing interest at this point were assessed medically by a physiatrist, who determined whether patients met the eligibility criteria. These included medically stable chronic pain that was not amenable to curative treatment, fluency in English or French, the ability to tolerate a tailored physiotherapy regimen, and no acute social or psychological crisis.

Eligible patients then took part in an assessment/education week. During these 4 half-days, patients underwent individual assessments by a psychologist, social worker, occupational therapist, and physiotherapist. They also attended group sessions about pain physiology, goal setting, and the program's cognitive-behavioral conceptual model.

Following the assessment/education week, patients began the active treatment phase of the program. This typically occurred over 3 consecutive weeks. Sessions were held in a group format led by health professionals from various disciplines, including medicine, nursing, occupational therapy, pharmacy, physiotherapy, psychology, social work, and therapeutic recreation. As part of the program, patients took part in fitness sessions 4 days per week, twice weekly group psychotherapy, occupational therapy workshops, relaxation training sessions, and interactive group discussions. Treatment groups were held 5 days per week for about 25 hours weekly. Didactic lectures were held on one morning of each week and covered such topics as community and financial resources, managing headaches, sleep problems, and pain medications.

Self-report measures

Socio-demographic and clinical characteristics—Socio-demographic and clinical characteristics (e.g., age, sex, pain duration, and primary pain location) were collected as part of the initial screening process.

Pain intensity—Participants rated their least, worst, and average pain intensity over the past two weeks, as well as their current pain. Responses were recorded on an 11-point numeric rating scale, with options ranging from 0 (no pain) to 10 (as intense as you can imagine). A total pain intensity score was computed by summing all items. This method of assessing pain intensity has been found to be reliable and valid.⁴¹

Functional limitations—Functional limitations were evaluated using a questionnaire developed by the Task Force on Records and Data Retrieval of the International Association for the Study of Pain.⁴² On this measure, respondents rated their degree of difficulty in performing 16 typical daily activities, such as getting in and out of bed and making meals. Each activity is evaluated using a 5-point scale, anchored by 1 (no difficulty) and 5 (unable to do). The minimum and maximum scores on this scale are 16 and 80, respectively. Higher scores indicate greater functional limitations. Previous research with chronic pain patients has demonstrated that this scale is internally consistent^{33,35} and sensitive to change.³⁵

Depressive symptoms—Participants completed the Patient Health Questionnaire (PHQ),^{43,44} a 9-item measure of depressive symptoms that includes a question addressing SI. The PHQ items correspond to the core diagnostic symptom criteria for major depressive disorder. Depressive symptoms, as evaluated in this study, were assessed using 8 items from the PHQ, with the SI item omitted. Participants rated the frequency of each symptom as they experienced it over the past two weeks. Responses ranged from 0 (not at all) to 3 (nearly every day). The 8-item version of the PHQ retains a very high correlation (i.e., $r = 0.98$) with the full PHQ scale.⁴⁵ As used here, PHQ scores could range from 0 to 24, with higher scores representing increasingly severe depressive symptoms. Different versions of the PHQ have been used widely in medical populations.^{45,46}

Overall distress—The 45-item Outcome Questionnaire (OQ)⁴⁷ is a global measure of symptom distress that is used primarily to assess the outcome of psychological treatments. Participants rated the frequency with which they experienced individual symptoms that often comprise presenting complaints in counselling and behavioral health settings. The symptoms cluster around psychological and somatic distress, as well as impairments in social roles and interpersonal relationships. Ratings are made over the past week, with responses recorded on a 4-point frequency scale anchored by 0 (never) and 4 (almost always). As with the PHQ, the item inquiring about SI was not included when scoring the OQ, resulting in a 44-item measure of overall distress. Scores could range from 0 to 176, with higher totals representing greater distress. Several studies support the psychometric properties of the OQ in a variety of settings.^{48–50}

Pain catastrophizing—The Pain Catastrophizing Scale⁵¹ is a 13-item questionnaire developed to assess negative pain-related cognitions. Item responses range from 0 (not at all)

to 4 (all the time), with total scores ranging from 0 to 52. Higher scores represent greater catastrophic thinking. This measure has high levels of validity and reliability.^{52,53}

Self-perceived burden—The Self-Perceived Burden Scale⁵⁴ is a 10-item measure of the degree to which respondents perceive that their requirements for instrumental, emotional, or financial support place undue caregiving demands on significant others. Items are evaluated on a 5-point scale, ranging from 1 (none of the time) to 5 (all of the time). Total SPBS scores range from 10 to 50, with higher scores indicating greater self-perceived burden. This measure has been shown to be valid⁵⁴ and internally consistent.³³

Suicidal ideation—SI was evaluated using a composite measure comprising one item each from the PHQ and OQ. In both cases, participants were asked to rate the frequency with which they experienced a desire for death or had thoughts of self-harm or suicide. On the PHQ, respondents rated, on a 4-point scale anchored by 0 (not at all) to 3 (nearly every day), how often in the past 2 weeks they had been bothered by thinking that they would be better off dead or that they wanted to hurt themselves in some way. On the OQ, respondents rated, on a 5-point scale, ranging from 0 (never) to 4 (almost always), how often in the past week they had thought of ending their lives. In this sample, the correlation between these two items was high at both pre-treatment ($r = 0.79$, $P < .001$) and post-treatment ($r = 0.82$, $P < .001$). For some analyses of the change in SI, a composite score was obtained by summing the two ratings.³¹ This composite score could range from 0 to 7.

Identification of Subgroups Differing in Suicidal Ideation

SI can range from passive thoughts of being better off dead to deliberate planning of an imminent suicide attempt. In order to maintain a focus on serious SI, we adopted a cut-off score > 1 on the OQ SI item. This corresponds to ratings of “sometimes,” “frequently” or “almost always” to the statement: “I have thoughts of ending my life.” Respondents who endorsed these scores were considered high in SI. Participants who gave scores = 1 on this item (i.e., “rarely”) were considered low in SI. Participants with scores = 0 on the OQ SI question and scores > 0 on the PHQ were also included in the low SI group. Such people may not have been currently suicidal, but did acknowledge recent thoughts of being better off dead or hurting themselves. Participants with scores = 0 on both items were classified as having no SI.

Although the OQ has not been used before to classify subgroups of suicide ideators, the PHQ SI item has been examined in several studies of medical patients.^{55–57} This single item was found to be sensitive to change in thoughts of self-harm following treatment for depression,⁵⁷ but its validity as a sole measure of serious suicidality has been questioned.⁵⁸ In studies that have conducted follow-up interviews with individuals who scored > 0 on the self-reported PHQ SI item, 20% to 35% were considered to be actually suicidal on interview^{58–60} and an additional 39% confirmed thoughts of being better off dead.⁶⁰ By combining the PHQ with the OQ SI item, which has good face validity as a direct inquiry into suicide, we sought to ensure the identification of individuals for whom SI was a significant clinical concern.

Data analyses

Data were analyzed using IBM SPSS Statistics 20. Established data screening procedures were followed.⁶¹ Internal consistency for each self-report scale was assessed using coefficient alpha. The proportion of patients endorsing high, low, and no SI at pre- and post-treatment were summarized using descriptive statistics. For the high and low SI groups, the proportions of patients who reported no longer having any SI at post-treatment were examined using a marginal homogeneity test. The demographic characteristics of participants classified as having high, low, or no SI were compared using parametric and non-parametric tests. Next, pre- and post-treatment differences were assessed using a repeated measures analysis of variance for the SI composite score and a repeated measures multivariate analysis of variance (MANOVA) for all other measures. Within these models, the between subjects factor was SI group (high, low, and no SI) and the within subjects factor was time (pre- and post-treatment). Of particular interest was the interaction between group and time. Post-hoc tests were performed, where appropriate.

A final set of analyses compared those individuals who either did or did not continue to report SI at the end of the interdisciplinary program. To this end, a two groups (sustained SI vs. no SI) by two time periods (pre- and post-treatment) repeated measures MANOVA was conducted. The goals of this analysis were to identify baseline characteristics of those individuals who continued to express suicidal thinking after treatment, as well as to evaluate whether sustained SI was embedded in a more limited overall response to treatment.

Results

Sample characteristics

A total of 363 patients were recruited at pre-treatment. Of these individuals, 17 (4.7%) were omitted because of missing data and 5 (1.4%) were excluded because participants shared, in a feedback session, that their questionnaire results did not accurately reflect their level of functioning. Seven (1.9%) patients dropped out before the end of the assessment/education week. Another 26 (7.2%) patients did not begin the treatment phase of the program, due mainly to the demands of the program exceeding their physical tolerances. Of the 308 remaining participants who began the treatment phase of the program, 36 (11.7%) dropped out before the end. The primary reason for this was, again, low physical tolerances. Eighteen (5.8%) individuals were excluded because of missing post-treatment data and 4 (1.3%) were omitted because their programs were modified or extended.

The final sample consisted of 250 participants, the majority of whom ($n = 156$, 62.4%) were women. The mean age was 47.64 ± 10.24 years and, on average, patients had chronic pain for 6.84 ± 7.65 years. Over half of the sample ($n = 146$, 58.4%) graduated from college or university, or obtained a trade certificate. Nearly half of participants ($n = 119$, 47.6%) were on disability or sick leave, and 48 (19.2%) were employed full- or part-time. The main pain locations were back ($n = 84$, 33.6%) and generalized body pain ($n = 74$, 29.6%).

Preliminary analyses

All scales demonstrated satisfactory internal consistency, with coefficient alphas ranging from .81 to .95.

Pre-treatment prevalence of suicidal ideation

Table 1 shows the cross-tabulation of pre-treatment scores on the 2 SI questions. On these baseline measures, 86 (34.4%) patients endorsed at least some SI or thoughts of being better off dead. Of these individuals, 56 (65.1%) were classified as having low SI and 30 (34.9%) were considered high. Although the OQ response of “sometimes” having thoughts of ending one’s life was used as the main criterion for identifying participants with high SI, 29 of 30 (96.7%) also had scores > 0 on the PHQ. The demographic characteristics of participants with no, low, and high SI are presented in Table 2. No significant differences were obtained among the three SI groups on any of the demographic variables, although there was a tendency for patients with high SI to be younger ($P = .085$).

Post-treatment prevalence of suicidal ideation

Of the 86 individuals who acknowledged at least some SI at pre-treatment, 45 (52.3%) no longer endorsed any suicidal thinking at the end of the program. Of the 41 patients with sustained SI, 19 were in the low group and 22 were in the high group. Of note, 9 individuals who endorsed no pre-treatment SI reported some at post-treatment, with all scores falling in the low SI range. Thus, a total of 50 patients endorsed SI at post-treatment. There was a significant difference in the proportion of patients in the three suicidal ideation groups at pre- and post-treatment, based on a marginal homogeneity test ($P < .001$). This indicated an overall decrease in suicidal thinking over time.

Of the 56 individuals with low pre-treatment SI (Table 1), 39 (69.6%) reported no SI at post-treatment. Twelve of the remaining 17 individuals (70.6%) continued to endorse low SI, whereas 5 (29.4%) endorsed high SI. Of the 30 participants with high SI at pre-treatment, 6 (20%) reported no SI, 7 (23.3%) reported low SI, and 17 (56.7%) continued to endorse high SI at post-treatment.

Change in suicidal ideation scores

Although most individuals with SI at pre-treatment experienced a reduction, some endorsed an increase. Accordingly, as a further check of the overall effect of treatment on SI, a 3 (SI group) $\times$ 2 (time) repeated measures ANOVA was conducted with the composite SI total score, which is a summation of the 2 SI screening items. The mean SI composite scores by time and SI group are shown in Table 3 and Figure 1.

Because the groups were defined on the basis of pre-treatment SI scores, the significant and substantial main effect for SI group, $F(2,247) = 350.25$, $P < .001$, $\eta^2 = .74$, was unremarkable except for the post-hoc finding that the group differences were retained at post-treatment. Specifically, patients in the high SI group at pre-treatment continued to have higher scores than both other groups at post-treatment ($P < .001$), whereas patients in the low SI group still had higher scores than patients with no pre-treatment SI ($P = .006$).

Of particular importance was the significant main effect of time, showing that there was a reliable decrease in SI scores from pre- to post-treatment, $F(1,247) = 110.09$, $P < .001$, $\eta^2 = .31$. This indicated that the intervention was associated with a robust overall decline in SI. The SI group by time interaction was also significant, $F(2,247) = 51.98$, $P < .001$, $\eta^2 = .30$, demonstrating that the decline was necessarily limited to the groups with either low or high SI at pre-treatment.

Change in pre- and post-treatment measures

The mean scores on all other outcome variables at pre- and post-treatment are shown in Table 3 and Figure 2. In the multivariate analysis, there were significant main effects for time (Wilks' Lambda = .55, $F(6,242) = 32.89$, $P < .001$, $\eta^2 = .45$), SI group (Wilks' Lambda = .76, $F(12,484) = 5.88$, $P < .001$, $\eta^2 = .13$), and the group by time interaction (Wilks' Lambda = .90, $F(12,484) = 2.21$, $P = .010$, $\eta^2 = .05$).

The main effect of time indicated that, with treatment, there was a significant pre-post improvement in pain intensity ($P = .008$), as well as more substantial improvements in functional limitations, depression, overall distress, catastrophizing, and self-perceived burden ($P < .001$).

The significant group by time interaction combined with the main effect for SI group, suggested that post-hoc analyses could be conducted by comparing the three groups separately at pre- and post-treatment. These results are shown in Figure 2. At pre-treatment, the three groups were comparable with respect to pain intensity and functional limitations ($P > .421$). Patients in the high SI group endorsed greater depressive symptoms, overall symptoms and distress, pain catastrophizing, and self-perceived burden than patients in the no SI group ($P < .001$). They also endorsed greater levels of pain catastrophizing and self-perceived burden in comparison to those in the low SI group ($P < .024$). Individuals low in SI, compared to those with no SI, endorsed greater depressive symptoms, overall distress, and pain catastrophizing ($P < .018$). There was a trend for self-perceived burden, with the low SI group scoring higher than the no SI group ($P = .058$).

At post-treatment, patients high in SI endorsed greater levels of depressive symptoms, overall symptoms and distress, pain catastrophizing, and self-perceived burden than patients in both the no and low SI groups ($P < .047$). Thus, the high and low SI groups showed differentiation on a broader range of measures at post-treatment than at baseline. The low SI group, at post-treatment, reported greater overall distress compared to the no SI group ($P = .034$). These two groups were similar on all other measures ($P > .233$).

Sustained suicidal ideation after treatment

The continued expression of SI after completing treatment is an important clinical concern. To further understand this issue, exploratory analyses were conducted on the subset of 86 patients who endorsed SI at pre-treatment. Specifically, the pre- and post-treatment scores of individuals who reported, at post-treatment, that they either did ($n = 41$) or did not ($n = 45$) continue to experience SI were compared.

The two groups were similar demographically, except that patients with sustained SI were younger (mean age = 44.27 years $\pm$ 10.76 years vs. 48.53 $\pm$ 9.12; $t(84) = 1.99$, $P < .05$). They also endorsed higher SI composite scores at baseline (mean = 3.00 $\pm$ 1.52 vs. 1.53 $\pm$ 0.76; $t(84) = 5.75$, $P < .001$).

A multivariate analysis of outcome measures revealed significant main effects for time (Wilks' Lambda = .42, $F(6,79) = 17.89$, $P < .001$, $\eta^2 = .58$) and sustained SI group (Wilks' Lambda = .82, $F(6,79) = 2.97$, $P = .011$, $\eta^2 = .18$), as well as a significant interaction (Wilks' Lambda = .70, $F(6,79) = 5.74$, $P < .001$, $\eta^2 = .30$).

The main effect of time indicated that patients with or without sustained SI both improved significantly from pre- to post-treatment on all measures (P s $< .028$). The main effect of group indicated that, collapsed across time points, patients with sustained SI endorsed greater depressive symptoms, overall distress, pain catastrophizing, and self-perceived burden (P s $< .011$), but comparable levels of pain intensity and functional limitations (P s $> .085$). However, this main effect is tempered by the finding of a significant interaction. When the two SI groups were compared at each individual time point, it was found that, at pre-treatment, they were similar on all measures except self-perceived burden, which was higher in the sustained SI group (mean = 32.54 $\pm$ 10.53 vs. 27.20 $\pm$ 9.31; $t(84) = 2.50$, $P = .015$). At post-treatment, patients in the sustained SI group scored significantly higher on all variables (P s $< .024$) except functional limitations, which did not differ between the groups ($P = .066$). This pattern suggests that patients with sustained SI at post-treatment experienced less overall improvement with the pain management program, and that their greater continuing difficulty was not limited to SI.

Discussion

In this study of individuals attending an interdisciplinary rehabilitation program for chronic pain, over one third (34.4%) reported some level of SI at pre-treatment. Of these individuals, approximately one third (34.9%) endorsed more frequent thoughts of suicide, representing 12% of the entire sample. The present findings fall within the general parameters of previous research, which has found that up to 41.5% of pain clinic attendees endorse at least occasional thoughts of taking their own lives²²⁻³⁰ and between 1.2% to 16.6% report more frequent or active suicidal thinking.^{22,23,27,28,31}

As in previous research, the pre-treatment data revealed that depressive symptoms are elevated among individuals with either high or low SI.^{23,26-30} Patients in the two SI groups also endorsed greater overall distress compared to those patients without SI. Because depression and global distress did not differ between the high and low SI groups, the elevations, at least before treatment, appear to be associated with suicidal thinking in general, rather than to SI of a specific frequency or intensity.

Pain catastrophizing and self-perceived burden showed a different pattern of association with pre-treatment levels of SI. Specifically, significant differences in catastrophizing were observed among the three SI groups, and the same general pattern was found with self-perceived burden. This suggests these cognitive and interpersonal variables may serve as

sensitive markers for SI, such that increasingly prominent catastrophizing or sense of burden are associated with increasingly frequent SI^{23,25,32} in, perhaps, a direct linear way. Future research may address the relative contribution of these two constructs to suicidal thinking in chronic pain, as well as the potential interaction between them. In one multivariate study, for example, self-perceived burden was predictive of SI after adjusting for, among other variables, pain catastrophizing.³²

The pre-treatment data are noteworthy because two important variables in chronic pain research, namely, pain intensity and functional limitations, did not differ between the SI groups. This stands in contrast to some previous findings^{23,25} but is consistent with others.^{26,28,32} In general, then, the significance of pain intensity and functional disability in the etiology of SI remains uncertain. It may be that among individuals attending interdisciplinary pain management programs, most of whom have long histories of relatively severe pain, a critical threshold for pain and disability has already been exceeded. In this event, individual differences in depression or cognitive and interpersonal responses to pain may be more relevant and proximally related to SI.

At the end of treatment, there were significant improvements on all outcome measures. Specifically, patients reported lower pain intensity, functional limitations, depressive symptoms, global distress, and pain catastrophizing. They also felt less burdensome to their supportive others. Nevertheless, patients who had high SI at baseline still reported greater difficulty in all of these areas compared to those who began with no SI. They did not necessarily show less of a treatment response, but rather began with more extreme scores on most measures and, at discharge, remained more symptomatic despite significant improvements. This finding is consistent with those obtained in studies of depression, in which more severely depressed patients have been less likely to achieve a full remission, even with a reliable treatment response.⁶²

In some respects, patients in the low SI group showed the most favorable treatment outcome. Compared to patients with no SI, their pre-treatment scores for depression, overall distress, and pain catastrophizing were all indicative of greater difficulty. At post-treatment, however, these two groups had comparable scores on all scales except the OQ measure of global distress. In this regard, they had moved from a pattern approaching that of the high SI group to one more similar to that of the no SI group.

Importantly, there was a robust decrease in SI for both the high and low SI groups. This was evident in the average SI scores, as well as in the movement of individuals between the high, low and no SI categories. Of the 86 participants endorsing at least some SI at baseline, over half reported none after treatment. To our knowledge, this is the first evidence that participation in an interdisciplinary chronic pain management program leads to a reduction in SI. This represents another important clinical benefit of programs of this type.

Most individuals with SI showed a reduction in their suicidal thinking; however, a small minority of patients reported an increase at the end of the program. There were also some patients whose SI scores did not change. Hence, suicidal thinking remains a clinical concern for some patients at post-treatment, especially those who had more frequent thoughts of self-

harm at the start of the program. The comparisons of patients with or without sustained SI after treatment indicated that those with sustained SI also benefitted less from participation (i.e., they experienced a less favorable treatment response). It would appear, therefore, that identifying interventions for treatment-resistant SI is an important area for future research.

Of the psychological and pain-related characteristics that were assessed at baseline, self-perceived burden was the only one associated with sustained SI at post-treatment. This interpersonal construct was recently shown to be correlated with several clinically-relevant variables in a chronic pain sample.^{32,33} Self-perceived burden refers to “empathic concern engendered from the impact on others of one’s illness and care needs, resulting in guilt, distress, feelings of responsibility, and diminished sense of self”.⁶³ It is a relevant issue for people with health problems that impose some degree of hardship or caregiving requirements on significant others.^{63,64} Self-perceived burden is similar to the construct of “perceived burdensomeness” in mental-health research. Perceived burdensomeness refers to the belief that one has become a drain on loved ones or on society in general, and that others might actually be better off with the person gone.^{65–67}

Perceived burdensomeness is a central feature of the interpersonal theory of suicide, in which it is hypothesized to be a major precursor to the onset of serious suicidal behavior.⁶⁷ The finding that high self-perceived burden at pre-treatment was associated with sustained SI afterwards is compatible with this theory. As such, it suggests that the interpersonal theory of suicide may be a promising framework for future hypothesis-driven, rather than exploratory, research into the problem of suicidal behavior in chronic pain. If so, it would be expected that thwarted belongingness (lack of meaningful interpersonal connection), which is another central construct of the theory, would interact with perceived burdensomeness in the prediction of SI.³²

This study provides important information about the prevalence, correlates, and responsiveness to change of SI in people with chronic pain. Nevertheless, a number of shortcomings are acknowledged. The assessment of change in SI was conducted as a pre- to post-treatment evaluation of an existing clinical program, rather than as an outcome of a randomized controlled trial. Because there was no control condition, the present results do not provide the highest standard of evidence that the interdisciplinary intervention actually caused the observed reductions in SI. Nonetheless, patients who remain on waitlists for pain clinics tend to deteriorate over time, rather than improve,⁶⁸ including on measures of depression and anxiety.²² Although no studies to our knowledge have specifically examined change in SI of waitlisted patients, the available evidence suggests that the improvements observed in the current investigation on measures of depression and distress are unlikely due to regression to the mean. This logic extends to SI, but confirmation will depend on future research using randomized controlled designs.

The interdisciplinary pain management program was designed primarily to address issues related to functional rehabilitation. Although the importance of psychological adaptation is a central component of this approach, the intervention was not intended as a first-line treatment for suicidal behavior. The observed decrease in SI is likely associated with other improvements in emotional functioning, as well as the learning and implementation of

adaptive coping strategies for managing both pain and distress. In a related vein, because treatment was offered in an intensive, interdisciplinary format, results might not generalize to other settings. Access to this type of program is increasing in many parts of the world; however, it is decreasing in the United States.⁶⁹ Whether less intensive programs can help to reduce SI remains to be determined.

The assessment of SI was based on a composite measure derived from two symptom scales, rather than a questionnaire or interview developed specifically for the research assessment of SI in clinical populations. As well, the time frames assessed by the symptom scales differed (one week for the OQ and two weeks for the PHQ). Although this approach resulted in clinically meaningful SI groupings and a composite score that was sensitive to change, future research would benefit from the inclusion of more in-depth, standardized measures that have been developed expressly for this purpose. For example, the Columbia Suicide Severity Rating Scale⁷⁰ has been recommended for inclusion in standard databases for clinical trials of pain treatments.⁷¹ In addition, this study was based on the literature on SI in chronic pain, with less emphasis on the factors that are predictive of SI in mental-health settings. It is known, for example, that hopelessness, diagnosed mental disorders, and a history of suicide attempts are important predictors of suicidal behavior in psychiatric populations.^{24,25,72–74} These factors might be equally relevant in the context of chronic pain and could be included in future studies.

Finally, the current quantitative data are informative about the extent of SI among patients seeking treatment for chronic pain, but they do not address the underlying reasons, as might be expressed in the personal narratives of the patients themselves. There is an opportunity to learn more about suicidal thinking in people with chronic pain by undertaking qualitative research to examine why these individuals might believe that they, and perhaps their families and loved ones, would be better off if they were dead. This would provide a greater depth to our understanding of the issue of suicide in chronic pain and, perhaps, identify new treatment directions.

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Figure 1.
Graph depicting pre- and post-treatment scores for the suicidal ideation (SI) composite measure by time and suicidal ideation group (n = 250).

Figure 2.

Graphs depicting pre- and post-treatment scores for the outcome variables by time and suicidal ideation group ($n = 250$). For each graph, the y-axis is centred around the grand mean ± 1 standard deviation. Solid lines represent the high suicidal ideation group. Dashed lines represent the low suicidal ideation group. Dotted lines represent the no suicidal ideation group.

Cross-tabulation of pre-treatment responses to suicidal ideation items on the Outcome Questionnaire and the Patient Health Questionnaire (n = 250)

Table 1

Patient Health Questionnaire	Outcome Questionnaire				
	Never	Rarely	Sometimes	Frequently	Almost Always
Not at all	164 (65.6)	26 (10.4)	1 (0.4)	0 (0.0)	0 (0.0)
Several days	7 (2.8)	21 (8.4)	18 (7.2)	0 (0.0)	1 (0.4)
More than half the days	1 (0.4)	1 (0.4)	3 (1.2)	5 (2.0)	0 (0.0)
Nearly every day	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.8)

Note: Table entries are the number (percentage) of participants endorsing each combination of responses. On the Outcome Questionnaire, participants were asked to rate how frequently “I have thoughts of ending my life.” On the Patient Health Questionnaire, participants were asked “Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead or hurting yourself in some way?” Different typefaces indicate the classification of respondents into groups with *no*, low, or **high** suicidal ideation

Table 2

Sociodemographic characteristics by suicidal ideation group (n = 250)

Characteristic	Suicidal Ideation Group		
	No SI (n = 164)	Low SI (n = 56)	High SI (n = 30)
Age, years, M ± SD	48.2 ± 10.3	48.0 ± 9.5	43.8 ± 10.9
Sex, n (%)			
Female	108 (65.9)	34 (60.7)	14 (46.7)
Male	56 (34.1)	22 (39.3)	16 (53.3)
Duration of pain, years ¹ , M ± SD	6.3 ± 6.6	7.9 ± 9.5	7.8 ± 9.1
Primary pain site, n (%)			
Head, face, mouth	5 (3.0)	0 (0.0)	2 (6.7)
Neck (cervical)	16 (9.8)	6 (10.7)	2 (6.7)
Shoulders, arms, hands	11 (6.7)	7 (12.5)	1 (3.3)
Back	57 (34.8)	18 (32.1)	9 (30.0)
Legs, feet	14 (8.5)	3 (5.4)	2 (6.7)
Pelvic region	3 (1.8)	2 (3.6)	0 (0.0)
Generalized	45 (27.4)	16 (28.6)	13 (43.3)
Other	13 (7.9)	4 (7.1)	1 (3.3)
Education level, n (%)			
Primary or secondary	33 (20.1)	11 (19.6)	5 (16.7)
Some college or university	33 (20.1)	15 (26.8)	7 (23.3)
College or university graduate	83 (50.6)	25 (44.6)	13 (43.3)
Trade certificate	15 (9.1)	5 (8.9)	5 (16.7)
Employment status, n (%)			
Full- or part-time	37 (22.6)	9 (16.1)	2 (6.7)
Unemployed	26 (15.9)	8 (14.3)	9 (30.0)
Student	1 (0.6)	0 (0.0)	0 (0.0)
Disability	61 (37.2)	24 (42.9)	13 (43.3)
Sick leave	13 (7.9)	6 (10.7)	2 (6.7)
Retired	11 (6.7)	3 (5.4)	0 (0.0)
Homemaker	5 (3.0)	1 (1.8)	1 (3.3)

Characteristic	Suicidal Ideation Group		
	No SI (n = 164)	Low SI (n = 56)	High SI (n = 30)
Other	10 (6.1)	5 (8.9)	3 (10.0)
Marital status, n (%)			
Single	21 (12.8)	9 (16.1)	8 (26.7)
Married/common-law	119 (72.6)	36 (64.3)	16 (53.3)
Divorced/separated	22 (13.4)	11 (19.6)	5 (16.7)
Widowed	2 (1.2)	0 (0.0)	1 (3.3)

Note: Numbers in parentheses are the percentages of participants within each group who have that characteristic. SI = suicidal ideation. M = mean. SD = standard deviation.

[†]Data are missing for 2 participants.

Table 3

Means and standard deviations of suicidal ideation composite scores and outcome variables by time and suicidal ideation group (n = 250)

Outcome	Suicidal Ideation Group					
	No SI (n = 164)		Low SI (n = 56)		High SI (n = 30)	
	Pre-Tx	Post-Tx	Pre-Tx	Post-Tx	Pre-Tx	Post-Tx
SI composite score	0.0 ± 0.0	0.1 ± 0.3	1.4 ± 0.5	0.5 ± 1.0	3.7 ± 1.2	2.6 ± 2.2
Pain intensity ratings	25.6 ± 5.9	24.8 ± 6.1	26.3 ± 5.0	24.9 ± 5.0	26.4 ± 5.8	25.7 ± 6.9
Functional limitations	40.5 ± 10.0	34.9 ± 8.9	42.4 ± 10.4	36.9 ± 8.4	43.1 ± 10.5	38.7 ± 10.0
Depressive symptoms	11.8 ± 4.6	8.6 ± 4.6	15.0 ± 5.4	8.9 ± 5.3	17.5 ± 4.4	12.5 ± 5.7
Overall distress	68.5 ± 19.6	58.2 ± 19.5	86.8 ± 19.9	66.5 ± 23.9	95.3 ± 21.3	84.4 ± 26.5
Pain catastrophizing	23.2 ± 12.1	15.5 ± 10.8	28.1 ± 10.7	18.3 ± 10.2	35.1 ± 9.6	27.3 ± 14.1
Self-perceived burden	24.6 ± 8.5	22.7 ± 7.4	27.8 ± 9.8	24.1 ± 8.7	33.3 ± 10.1	28.4 ± 9.2

Note: SI = suicidal ideation. Tx = treatment. Data are presented as mean ± standard deviation. SI composite scores at pre- and post-treatment were calculated by summing the suicidal ideation items from the Patient Health Questionnaire and the Outcome Questionnaire.