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PSYCHIATRIC MANAGEMENT OF PAIN (M CLARK, SECTION EDITOR)

Chronic Pain and Suicide: Understanding the Association

Jill M. Hooley · Joseph C. Franklin · Matthew K. Nock

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Abstract Chronic pain conditions are associated with an elevated risk for suicide. Of particular importance is the question of *why* pain conditions might be linked to increased suicide risk. We discuss the association between chronic pain and psychological pain, particularly in the context of depression, and the use of suicide as an attempt to escape from what is perceived as unbearable suffering. We also consider the role that chronic pain may play in increasing the capacity for suicide. Bridging across research areas and drawing on the interpersonal-psychological theory of suicide, we suggest that chronic pain may facilitate the development of a key risk factor for suicide: fearlessness about death. Given that chronic pain can lead to (and be exacerbated by) depression, engender hopelessness, facilitate a desire for escape through death, and erode the natural fear of dying, clinicians must be aware of psychological processes that can combine to create elevated suicide risk in patients with chronic pain, and they should also assess and treat suicide risk factors in these patients.

Keywords Suicide · Risk factors · Pain · Self-injury · Depression · Hopelessness · Fearless about death

Introduction

Most people regard their life as the most precious possession they have. Yet, worldwide, more than 1 million people die by suicide every year [1]. In the United States, suicide is the 10th most common cause of death, and in 2010 (which is the most recent year for which official final data are currently available), slightly more than 38,000 people took their own lives. What this means is that there is one suicide every 13.7 minutes [2]. Figures such as these highlight the magnitude of the problem and illustrate the extent to which suicide must be regarded as a major public health issue globally.

Some of the key risk factors for completed suicide are well known. These include older age, male sex, previous suicide attempt, and the presence of psychiatric problems [3]. In this article we seek to move beyond these well-established risk factors by providing new insights into psychological processes that may be especially important for understanding suicide risk – particularly for those experiencing chronic pain.

We begin by reviewing some of the most current recent research linking chronic pain to suicide, and highlight several pain diagnoses that have been associated with elevated suicide risk. We then address the question of *why* pain conditions might be linked to an increased risk of suicide. We consider the role of psychological pain and discuss the association between chronic pain and emotional pain, particularly in the context of depression. We also highlight the commonalities in the neural circuitry devoted to processing physical and psychological pain, and the potential use of suicide as a means of escaping such pain. Finally, in a novel integration of two different areas of research, we consider the role that chronic physical pain might play in increasing the capacity for suicide, focusing on the construct of fearlessness about death. Overall, we suggest that chronic pain leads to (and is exacerbated by) depression, engenders hopelessness, facilitates a desire for escape, and also erodes the natural fear of dying. In other words, specific (and measurable) psychological processes conspire to increase suicide risk in patients with chronic pain conditions. Physicians treating these patients should be fully aware of the elevated suicide risk that exists. Clinicians should

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J. M. Hooley (✉) · J. C. Franklin · M. K. Nock
Department of Psychology, Harvard University, 33 Kirkland Street, Cambridge, MA 02138, USA
e-mail: jmh@wjh.harvard.edu

also have knowledge of the potential reasons for this increased risk so that such factors can be assessed and targeted in intervention efforts.

Physical Pain and Suicide

Several recent studies have shown that patients experiencing chronic pain are at elevated risk of suicidal thoughts and behaviors. For example, Breslau and colleagues [4] found that, compared to individuals without a history of headaches, both migraine (OR=4.43) and non-migraine (OR=6.20) headaches were associated with substantially increased odds of attempted suicide, even after controlling for demographic factors, psychiatric diagnoses, and previous suicide attempts. In a large national sample of people receiving services through the Veterans Healthcare System, Ilgen and colleagues [5•] similarly found that a range of non-cancer-related pain conditions were associated with suicide death. These conditions included arthritis, back pain, migraine, neuropathy, headache or tension headache, fibromyalgia, as well as psychogenic (physically unexplained) pain. After controlling for such important demographic characteristics as age, sex, and number of other medical conditions, the authors reported that all of these pain-related diagnoses were associated with elevated suicide risk. Interestingly, the greatest risk for suicide was found in individuals who had been diagnosed with psychogenic pain (hazard ratio=2.61), followed by those suffering from migraines (hazard ratio=1.68). Although controlling for psychiatric diagnoses reduced these associations, many remained statistically significant. This indicates that chronic pain is linked to suicidality via mechanisms that are at least partially distinct from third variables such as depression.

These findings appear to generalize to a range of age and ethnic groups [6–8]. For instance, Bohman and colleagues [6] found that, compared to non-depressed adolescents, depressed adolescents reporting multiple somatic symptoms (e.g., headache, abdominal pain, limb pain) displayed an eightfold increase in future suicidal thoughts and behaviors. Strikingly, this association was similar within the group of non-depressed adolescents: somatic symptoms were associated with large increases in the likelihood of future suicidal thoughts and behaviors (OR=2.73–4.67).

The findings from these studies suggest that some chronic pain conditions place patients at particular risk of reaching a point where suicide becomes something they are willing to consider. The case of psychogenic pain is especially interesting because having such an ambiguous diagnosis may create unique additional burdens for patients. Patients with psychogenic pain typically have other pain condition diagnoses [5•]. The stigma associated with psychogenic pain coupled with the lack of an accepted cause and effective treatment may also make coping with the pain much more challenging. The situation may be further compounded by lack of support from family, friends, or even treatment providers, leading to enhanced suffering, and a possible increased risk of suicide at a later point.

Psychological Pain and Suicide

Experiencing chronic physical pain clearly elevates suicide risk. However, experiencing psychological (or emotional) pain is an even more powerful predictor of death by suicide. A recent national cohort study of more than 7 million adults in Sweden who were followed for eight years provides a good illustration of this [9]. The suicide rate over the course of the follow-up period was 0.12%. As expected, and consistent with previous research [10, 11], the presence of *any* psychiatric disorder was strongly predictive of suicide risk in both males and females. The most powerful single risk factor, however, was depression. Even after considering other sociodemographic and health variables, a diagnosis of depression was associated with a 19-fold risk of suicide in women and a 15-fold risk in men. Importantly, the risk of suicide was highest during the first three months following diagnosis of depression. It was also the case that rates of suicide were higher in depressed patients who were not being treated with antidepressants than in patients whose depression was being treated with medication.

Findings such as these naturally raise the question of whether people who are experiencing chronic physical pain are more likely to become clinically depressed. In a recent investigation, Gerrits and colleagues [12•] assessed baseline levels of pain in a sample of 614 participants (mean age 41 years). One important feature of the design of this study was that participants with a past history of either diagnosable depression or anxiety were excluded. Over the course of an almost four-year follow-up, 15.5% of participants developed a first-incidence episode of depression. Higher chronic pain severity was a significant predictor of the onset of this depression, as was the number of locations in which pain was experienced. Pain in the back, neck, head, orofacial area, abdomen, and joints were all associated with subsequent development of depression in this sample. Moreover, even when baseline (subthreshold) symptoms of depression were considered, there was still a significant association between joint pain, as well as experiencing pain in multiple locations, and the onset of depression. Taken together, these findings show that experiencing pain is a risk factor for the development of depression. Other findings from the same study suggest that people who have symptoms of depression are more likely to report that they experience physical pain. In other words, pain and depression are very much intertwined [13••]. This is of considerable importance in light of the role that physical and psychological pain play in the risk for suicide.

People who are depressed are undoubtedly in psychological pain, but the construct of psychological pain encompasses more than depression. Over two decades ago, Shneidman [14] coined the term "psychache" to refer to the unbearable psychological pain that he believed was the root cause of all suicide. Unlike a diagnosis of depression, psychache itself is not a psychiatric construct. Rather, it refers to hurt, anguish, or pain in the mind – the kind of pain that might come from excessive shame, relentless guilt, fear, loneliness, or dread of old age. Shneidman believed that escape from unbearable psychological pain was the primary motivation for suicide. Extending this idea further, it is also reasonable to suggest that some individuals may perceive physical pain as unbearable and may ultimately settle on death as preferable to chronic pain (see also [15]).

The link between psychache and psychiatric difficulties warrants consideration. Unbearable psychological pain may result from severe emotional trauma, such as the death of a child. In such instances, no psychiatric disorder is necessarily involved. Nonetheless, the construct of psychological pain clearly shares variance with important clinical constructs such as depression. For example, in depressed outpatients, Mee and colleagues [16] reported that a 10-item self-report measure of psychological pain was significantly correlated (r=.56) with depression, measured using the Beck Depression Inventory [17]. Psychological pain was also correlated (r=.46) with scores on the Beck Hopelessness Scale [18]. Moreover, as might be expected, both depression and hopelessness were significant predictors of suicidality, measured using the Suicidal Behavior Questionnaire (Linehan & Addis, 1990, unpublished measure).

Importantly, however, the measure of psychological pain used in this study captured unique variance and made a significant independent contribution to the prediction of suicidality even after depression or hopelessness had been entered into the statistical model. Similar findings from undergraduate samples have also been reported [19]. What this means is that there is more to psychological pain than just depression or hopelessness. The inclusion of a measure of psychological pain provides incremental information about suicide risk over and above that provided by constructs such as depression or hopelessness alone.

The Link between Physical and Psychological Pain

Recent reviews indicate that the brain does not contain specialized modules for specific (e.g., fear, happiness) or even general (e.g., cognition, emotion, memory) psychological phenomena [20]. Indeed, the typical cortical region is involved in nine of the following eleven task domains: action execution, action inhibition, action observation, vision, audition, attention, emotion, language, mathematics, memory, and reasoning [20]. This indicates that the brain often employs the same circuitry for multiple functions, suggesting that psychological processes that seem phenomenologically distinct (e.g., sensing, thinking, feeling) may be ontologically indistinguishable [21].

These findings are consistent with evidence that there is substantial overlap among the neural correlates of psychological pain and physical pain [22]. In particular, both forms of pain are strongly correlated with activity in the anterior insula and the anterior cingulate cortex [23]. A recent meta-analysis [24] showed that these two structures serve similar and highly interrelated functions. Specifically, the anterior insula represents the sum of bodily sensations (especially visceral sensations) in awareness, and the anterior cingulate combines these sensations with other information (e.g., attention, memory) to compose an affective state. Accordingly, it is no surprise that these areas are strongly associated with emotional pain and the affective component of physical pain.

Based on this overlap, factors that influence one form of pain should incidentally influence the other. Of particular interest with regard to the present discussion is that, in the study by Mee and colleagues [16] described earlier, psychological pain and physical pain were significantly correlated (r=.52). A similar link between pain and depression was noted by Gerrits et al. [12•]. Further supporting the link between physical and psychological pain, the physical painkiller acetaminophen has been shown to reduce emotional pain induced by a social exclusion task, and this appears to be mediated by anterior insula and anterior cingulate activity [25]. Moreover, providing evidence for a causal link, a recent experimental study found that, compared to placebo, an endotoxin that stimulates proinflammatory cytokines generated significantly greater feelings of social disconnection, which also appeared to be mediated by anterior insula and anterior cingulate activity [26].

In short, the findings described thus far converge on the idea that physical pain may commandeer some of the brain activity produced by psychological pain and vice versa. To the extent that this is true, we should expect that people in physical pain are likely to be doubly hurt: not only do their bodies create pain and discomfort, but this physical pain may also be a source of emotional suffering as well.

Fearlessness about Death

For most people, thoughts of death are naturally quite frightening. Suicide constitutes a major threat to survival. The very idea of it, therefore, generally elicits a great deal of fear, and this fear presents a barrier to suicidal behavior. According to the interpersonal-psychological theory of suicide [27, 28] in order for a person to engage in suicidal behavior, there must not only be a desire for death but the capability to carry out a suicidal act. This capability requires that one overcome the natural fear of death that most humans possess.

Although initial evidence suggests that suicide capability may be partially genetic [29], there is evidence that this capability may be acquired over time through processes such as habituation. Specifically, across several exposures to painful and provocative events, individuals may become less fearful about the painfulness and deadliness of suicidal behavior. For example, several studies have shown moderate correlations between the reported experience of painful and provocative events and the self-reported capability for suicide (e.g., [30, 31]). This may partially explain why both suicidal and nonsuicidal self-injury (e.g., self-cutting) are powerful predictors of future suicidal behavior [32–34]. Supporting this idea is the fact that nonsuicidal self-injury is associated with increased self-reported suicide capability [31, 35], and individuals with a history of attempted suicide endorse a diminished fear of death and suicide [36, 37].

Particularly interesting is the link between fearlessness about death and greater pain tolerance. In a behavioral test, people who scored higher on a very brief self-report measure of fearlessness about death show increased tolerance for pressure pain [38]. The same study reported that fearlessness about death was also modestly correlated with self-perceived ability to tolerate physical discomfort as well as with greater stoicism. Moreover, people who are more fearless about death report that they are less fearful of severe pain, minor pain, and medical pain.

The study just described involved a cross-sectional design and used an undergraduate sample. Absent prospective studies, we know little about the extent to which experiencing chronic pain may erode a natural fear of death and thus facilitate the development of a known risk factor for suicidality. Nonetheless, such an idea is highly plausible.

One final issue warrants consideration. The interpersonal theory of suicide [27, 28] proposes that two factors – thwarted belongingness and perceived burdensomeness – are key psychological constructs that lead to a desire to commit suicide. As experimentally demonstrated by Eisenberger and colleagues [26], it is reasonable to expect that physical pain conditions create a context wherein people experience reduced feelings of social connection (thwarted belongingness). Those suffering from physical pain conditions may also feel that they are creating a burden for others, and that their family and friends would be better off without them (perceived burdensomeness). Recent experimental studies have shown that these conditions may induce suicidal thoughts, even in individuals with no psychiatric diagnosis. For instance, across six studies in healthy individuals, Chatard and Selimbegović [39] found that brief failure-related primes (e.g., instructions to think/write about greatest personal failure) increased accessibility to suicidal thoughts. Similarly, Tang and colleagues [40] recently found that failure-related primes increased implicit associations with death/suicide in healthy individuals. The authors of these studies interpreted their findings as evidence that failure induces an unpleasant psychological state from which individuals are motivated to escape [cf 15]. Moreover, such feelings of thwarted belongingness and perceived burdensomeness are likely to be further exacerbated by the depression and hopelessness that, as we have seen, often accompany physical pain. For all of these reasons (summarized in Fig. 1) the risk of suicide in patients with chronic pain is a major source of clinical concern.

Conclusions and Recommendations

Clinicians involved in the treatment of patients with physical pain conditions should be aware of the increased risk of suicide in these individuals. This is because physical pain holds the potential to set into motion a cascade of events that are linked to elevated suicide risk. Moving beyond a consideration of standard psychiatric risk factors such as past suicidal behavior or psychiatric comorbidity, we have outlined a model highlighting some of the key psychological processes that may be especially relevant in the case of chronic pain,

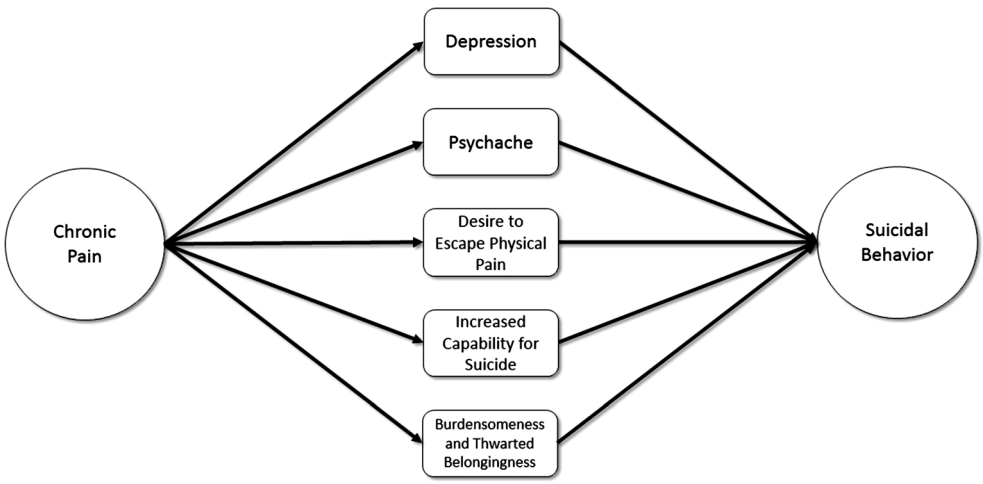

Fig. 1 Chronic Pain Increases Risk Factors for Suicide

which can be used to help clinicians develop more individually tailored risk assessments for their patients.

Physical pain can lead to the development of depression and the experience of unbearable psychological pain. This in turn may increase a person's risk of attempting to escape via suicide. Physical pain also is linked to diminished fear of death – another important risk factor for suicidal behavior. Because physical pain creates suffering, isolates people, becomes a prime focus of their attention, and compromises a broad range of occupational and interpersonal activities, it also diminishes the quality of people's lives. All of this can conspire to reduce a sense of belongingness, create a sense of being a burden to loved ones, and facilitate a need to escape – a need that, for some people, is fulfilled by death by suicide [15].

Measuring psychological pain is relatively simple. Mee and colleagues [16] have described a 10-item scale (the Mee-Bunney Psychological Pain Assessment Scale [MBPPAS]) that can be readily incorporated into clinical practice. The same is true of the 13-item Psychache Scale [41]. Ribeiro and colleagues [38] have described a set of items that assess fearlessness about death. Combined with measures of depression and hopelessness, these brief questionnaires can provide the clinician with valuable information about the suicide potential of their patients who experience chronic pain. Although the absolute risk is small, the consequences of suicide are devastating. Most patients who end their lives visit their doctors in the weeks before their suicide [42]. This creates an important opportunity to prevent this tragic outcome. By being informed about the risks and risk factors, and with attention to individual and real-time psychological changes, those involved in the treatment of such patients may be able to provide much needed assistance to their patients at a time when it is most critical.

Compliance with Ethics Guidelines

Conflict of Interest Dr. Jill M. Hooley, Dr. Joseph C. Franklin, and Dr. Matthew K. Nock each declare no potential conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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- •• Of major importance

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