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Original Reports

The Impact of Adolescent Chronic Pain on Functioning: Disentangling the Complex Role of Anxiety

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Abstract: A number of adolescents with chronic pain have clinically significant disability across physical, social, and academic activities, and pain severity only explains a portion of the variance in functioning. Thus, it is important to identify therapeutic options to improve adolescents' functioning. In contrast to studies with adults with chronic pain, research in pediatric pain has not consistently found anxiety to be a good predictor of pain-related disability. The present study evaluated pain, anxiety, and functioning in 222 adolescents with chronic pain. Results indicated that pain was consistently and linearly related to disability across measures of physical and social functioning, school attendance, and physician visits. The relation between anxiety and functioning was complex; increased anxiety was related to poorer physical and social functioning and was related to fewer physician visits, although it was not associated with school attendance. Additional analyses revealed that anxiety serves to moderate the relation between pain and functioning. Specifically, at high anxiety, pain was not related to functioning, but at low anxiety, pain consistently predicted disability. In other words, highly anxious adolescents were functioning poorly regardless of the level of pain. The moderating role of anxiety highlights a number of research and clinical possibilities to explore with adolescents with chronic pain-related disability.

***Perspective:** Data suggest that high anxiety is associated with poor functioning irrespective of pain intensity. At low anxiety, higher pain predicted greater disability. Anxiety is important to assess when investigating potential reasons for pain-related disability.*

***Key words:** Adolescent, chronic pain, disability, anxiety.*

A quarter to a third of youth report chronic, persistent, or episodic pain,[9,12,14,16,32] and a clinically significant minority also report associated dysfunction across a range of activities (eg, physical, social, academic).[7,37] Although the severity and duration of pain predicts some of the variance in measures of functioning and quality of life,[17,30] there are other factors that buffer or exacerbate pain-related disability. Studies with adult patients suggest that psychological variables influence disability above and beyond pain,[49] and anxiety in particular has been found to play a critical role.[3,34,47,50] Paralleling adult chronic-pain findings, research with pediatric chronic-pain patients suggests that pain intensity and duration only predict a moderate amount of the variance in disability,[4,11] and that psychological factors might help explain disability.[48] Whereas some studies have found positive associations between anxiety and disability in these pediatric patient,[22,52] other studies have not found an anxiety-disability link, particularly when controlling for other variables.[11,13,21,35,48] On the other hand, depression has consistently been found to predict disability in adolescents with chronic pain.[4,11,20,22,23]

From a behavioral perspective, chronic pain can lead to avoidance of situations that exacerbate or are believed to exacerbate pain. In turn, the avoidance itself is

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negatively reinforced if pain is minimized or even unchanged.[10,50] For example, adolescents might avoid school and time spent in social and recreational activities (eg, sports) in efforts to avoid pain. In fact, the affective aspects (eg, depression, anxiety, fear of pain) might be the critical factors rather than pain that fuel the avoidance behavior. A cycle might ensue involving anxiety and depression driving avoidance, which leads to greater physical and social disability, which further heightens anxiety and depression.

Research with adults support this hypothesis in that anxiety has been shown to heighten sensitivity to pain,[6] is associated with fear of pain, predicts physical complaints beyond the impact of pain,[27] and leads to avoidance of activities and worsening of disability in chronic pain patients.[29,46] Further, treatment targeting anxiety in adults with chronic pain has resulted in reductions in anxiety, as well as improvements in pain and indices of physical and emotional functioning.[28,51] Thus, when anxiety is high, anxiety rather than pain might drive avoidant behavior. On the other hand, in the absence of anxiety, it might be pain itself that leads to avoidance of physical and social events. In other words, whether or not pain symptoms lead to adolescents' physical and social disability might be moderated by anxiety. It should be noted that this pain-anxiety-disability theoretical explanation is largely supported by data with adults, and that anxiety might function differently in youth.

The purpose of this study was to explore this pain-anxiety interplay in relation to physical and social functioning in a sample of young people. It was expected that when adolescents have high anxiety, they would have poor functioning regardless of pain severity. At low anxiety, pain would be linearly related to physical and social disability.

Methods

Participants

The study was approved by the local UK National Health Service ethics committee and all participants consented to participate. Two hundred and twenty-two adolescents from 2 adolescent chronic pain clinics—an outpatient rheumatology clinic and a residential chronic pain clinic—and their parents participated. On average, adolescents were 15 years old (M = 14.8 years; SD = 1.9 years; range = 10.9–18.9 years), female (74.6%), and white European (99.1%). The adolescents had chronic pain for an average of 4.2 years (SD = 4.1 years; range = 3 months–17.5 years) and pain was reportedly experienced in all body parts (43.1%), a limb (37.3%), the back (7.7%), the head (4.8%), the abdomen (4.3%), the hip (1%), or chest (.5%). Most patients (72.1%) had noninflammatory pain (eg, low back pain) with a minority (27.9%) having inflammatory pain (eg, arthritis).

Parents provided proxy-report of adolescent's pain-related disability. On average, the parents were mothers of the patient (91%; fathers, 5%; other 4%), 43.8 years of age (SD = 6.4 years), full or part time employed (67%), married (78%), and in good (33%) to very good (31%) health.

This sample has been examined in 2 prior studies to validate the self-report pain-related disability scale[7] and the parent proxy version.[8] In addition, a study found that a portion of the sample (N = 110) attending a chronic-pain clinic did not demonstrate a relation between anxiety and functioning.[11] However, moderation analyses were not conducted. Thus, the current investigation is unique and designed to extend and explain prior findings with these and other adolescents with chronic pain and their parents.

Measures

Pain Intensity

Pain was assessed via a 10-cm visual analog scale (VAS), querying adolescents about their typical pain over the last week. The extremes of the VAS were anchored with no pain (0) and the worst pain possible (10). VAS's have been shown to be valid and reliable and recommended as a well-established index of pain intensity.[5]

Anxiety

To measure anxiety, adolescents completed the Spence Children's Anxiety Scale (SCAS[39,40]). The SCAS contains 44 items (eg, "I have trouble going to school in the morning because I feel nervous or afraid") scored on a 4-point scale ranging from Never (scored 0) to Always (scored 4). Large sample analyses have supported the measure's factor structure and convergent validity.[39,41] Strengths of the SCAS are that it was not created as a downward extension of adult anxiety measures, as was done with other widely-used measures (eg, Revised Children's Manifest Anxiety Scale;[36] the State-Trait Anxiety Inventory for Children[42]), but considered anxiety that is relevant to adolescents. Further, the SCAS measures anxiety that is more consistent with diagnostic systems, such as the DSM,[1] which facilitates communication among health-care professionals. The SCAS has consistently demonstrated good reliability (eg, total score internal consistency Cronbach's alpha .92 and 6-month test-retest correlation .60[39]) and validity (eg, correlations among other measures of pediatric anxiety range, .71–.81[31]). In addition, sensitivity analyses have shown that the SCAS differentiates between adolescents with and without anxiety disorders.[39,53] In the current sample, internal consistency was good (Cronbach's alpha .87), and the SCAS total score was significantly correlated with the Bath Adolescent Pain Questionnaire (BAPQ) measures of General Anxiety, .67; the Pain-specific Anxiety, .45; the BAPQ-Parent version General Anxiety, .47; and the BAPQ-P Pain-specific Anxiety, .24 (all P's < .01). Only the SCAS total anxiety score was used in the current study, which reflects an overall general tendency toward panic, fear, obsessive-compulsiveness, and/or diffuse worry.

Functioning

Five diverse and multi-informant indices of functioning were selected. The Bath Adolescent Pain Questionnaire (BAPQ)[7] is a 61-item self-report survey of adolescents' chronic pain-related functioning across 7