Psychological Distress and Back Pain

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Chronic low back pain has become a major health problem in today's society. Low back pain disability is the most expensive benign condition in industrialized countries and is the number one cause of disability in people less than 45 years old (1). Low back pain lasting for longer than one day affects 40 percent of adults in any one-year period (2). In addition, there still is a lot uncertainty as to how structural or morphologic changes in the lumbar spine relate to a patient's clinical symptoms as seen on special imaging studies (3). Further investigations have showed this relationship to be true. In one study by Boden, 67 asymptomatic individuals had a magnetic resonance image (MRI) performed and found at least one herniated disc in 20 percent of the volunteers who were less than 60 years old (4). In this same group of volunteers, they found at least one herniated disc in 36 percent of those individuals who were greater than 60 years old. In another study by Jensen (5), a similar pattern was found in 98 asymptomatic individuals. Just as there is uncertainty in diagnosis of low back pain, there also is uncertainty in choosing the best form of treatment for the long-term relief of low back pain. Many medical, physical and surgical therapies can provide short-term relief of low back pain, but appear to have little impact on the recurrence or persistence of the symptom (6). Most individuals recover within six weeks, but there is still 5-15 percent who are unresponsive to treatment and continue with disability (7, 8, 9, 10). The total expenses related to low back pain in the United States exceeds $60 billion per year most of which are related to those individuals who are unresponsive to treatment (11). The inability to solve the low back pain problem and find a cure in the traditional model of spinal disease has lead to a broader model of the problem. This broader model is one that incorporates psychological and social influences on pain experience. There are five epidemiological studies [Croft (12), Boos (13), Atkinson (14), Polatin (15) and McWilliams (16)] that at least suggest an association between chronic back pain (or just back pain) and psychological distress like anxiety and depression. The purpose of this paper is to review these five articles and evaluate the...
epidemiological relationship between back pain and psychological distress (anxiety and depression).

**REVIEW OF THE LITERATURE**

In the first paper by Croft (12) a prospective population based cohort study was conducted to examine the question of whether symptoms of psychological distress in individuals free of low back pain can predict a new episode of low back pain. Previous studies on this relationship have been cross-sectional and have therefore lacked the design to distinguish cause from effect. Croft’s study used a one-year follow up period to evaluate incidences of low back pain to help answer this cause and effect relationship question. The General Health Questionnaire (GHQ) was the main instrument used to identify symptoms of depression and anxiety of recent onset. The GHQ score was divided into thirds (high, middle and low) on the basis of its distribution among individuals. A score in the upper third category of GHQ was considered high and correlated with a person in the most amount of psychological distress. A score in the lower third correlated to a person who had a low amount of psychological distress.

The general results of this study show that individuals who had a GHQ score in the upper one third were more likely to develop a new episode of non-consulting low back pain as compared to those who had GHQ score in the lower third category (adjusted odds ratio, 1.8 [1.4, 2.4]). These results were among a group of individuals who were free of low back pain for at least one month prior to the completion of the GHQ. The increase risk persisted when analysis was restricted to those who at baseline could not recall ever having had low back pain in the past and to those with full-time employment.

This study was well done but it had two possible biases that were adequately addressed by the authors. The two biases had to do with the number of non-responders in their initial baseline postal survey and the number of non-responders in their one-year follow up survey. Out of a total of 7,669 initial baseline surveys mailed, 4,501 responded to their survey for an overall response of 59 percent. That meant that 3,168 individuals did not respond to the survey and this could represent a group of individuals that didn’t show the same relationship of increased incidence of low back pain and GHQ scores in the upper one-third category. The authors addressed this issue. They were able to calculate the consultation rate for low back pain in the baseline non-responders (5.5 percent) and compare it to the responders (7.1 percent). They concluded; “differences in back pain experience between responders and non-responders exist but they are not large and are unlikely to distort the observed association between GHQ score and new episodes of low back pain.” The non-responders to the one-year follow-up survey consisted of 968 individuals, which was calculated as a response of 64 percent. Possible bias also exists here because these 968 individuals could possess different characteristics, which could affect the incidence of low back pain and its relationship with the GHQ score. The authors have also addressed this potential bias in their paper. They compared baseline characteristics between those who did not return the one-year follow-up survey and those who did complete the follow up survey. They found that the non-responders were younger than the responders and were more likely to smoke and have a higher GHQ score. The authors gave several reasons and concluded that: “such differences
were unlikely to have distorted the main association investigated in this cohort study."

In general, confounding variables are factors that might play a role or be a reason for producing certain results in a clinical study other than the primary variables. In Croft's study, possible confounding variables that were addressed and analyzed (by multivariate analysis) were age, gender, social class, self-rated health and smoking. A few associations were found like car ownership and baseline health rating were related to non-consulting low back pain and gender to the likelihood of consultation. After analysis was completed, the increased risk of subsequent low back pain during the one-year follow-up period associated with baseline GHQ score clearly persisted after adjustment for these potential confounders was made. In other words, the confounding variables listed above could not explain the results of the study. The authors even compared the one-year follow-up results with the results obtained from a cross-sectional analysis of the baseline survey and got the same results. A potential confounder that was not addressed by the authors was the prevalence of work related risk factors. It has been shown that several occupational factors have shown associations with increased risk of sciatica and disc herniations (low back). These factors include frequent heavy lifting, frequent twisting and bending, exposure to vibration and sedentary activity. It doesn't appear that the authors analyzed the work-related risk factors as potential confounding variables and as a result the authors did not eliminate the work-related risk factors as a potential confounder. The authors did gather current employment status but it seems that that information is rather limited.

A paper by Boos (13) and colleagues accessed the diagnostic accuracy of several tests to see if these tests could identify patients with symptomatic disc herniations from matched asymptomatic volunteers. The tests they accessed included magnetic resonance imaging (MRI), work perception and psychosocial factors such as depression and anxiety. The focus of this paper will be on the diagnostic accuracy assessment of the psychosocial factors like depression, anxiety and their relationship between the symptomatic disc herniation patients and the asymptomatic volunteers. In the diagnostic accuracy findings, depression and anxiety had sensitivity rates of 54.4 percent and 63.0 percent respectively and these same two factors had specificity rates of 84.8 percent and 71.7 percent respectively. These rates were fairly close to the average (mean) of all five of the psychosocial factors (self-control, social support, and marital status) which for sensitivity was 56.6 percent and for specificity was 89.1 percent. In addition follow-up univariate one-way ANOVA's showed that patients reported significantly more anxiety (P<0.006), and more depression (P< 0.0001) than their matched partners (asymptomatic volunteers). To put these results in perspective against the other diagnostic tests, it should be noted that the author's “best” model for discriminating between the two groups consisted of four factors. The four factors were the extent of neural compromise (as seen on MRI), mental stress, depression, and marital status. These four factors had a sensitivity rate of 82.6 percent and a specificity rate of 89.1 percent.

This prospective case-control study by Boos was a very well done study, but there were a few possible biases and limitations to the study. In regard to the matching success of the asymptomatic volunteers to the symptomatic patients, a few differences between the two groups should be mentioned. The paper discusses these differences in the results section. The differences were that the asymptomatic group was on average one year older.
than the patient group (36.2 vs. 35.2), the asymptomatic group had a higher prevalence of heavy lifting, twisting, bending, and sedentary activity while a lower rate of job-related exposure to vibration. Out of all the above differences, sedentary activity level was the only one that was statistically significant. These differences probably did not affect the results of the psychosocial factors discussed above. Smoking status between the two groups was not looked at. It has been shown that smoking can influence the biochemistry in the tissues of the low back and might play a role in low back pain. There is the possibility that the symptomatic patient group contained more smokers than the control group and if this were true, smoker status could act as a confounding variable and could be a reason for the results that this paper obtained. Another limitation to this study was the sample size of 46 patients with matched controls. A larger sample size could have made a bigger impact as to the generalizability of the results to the target population.

The third paper is by Atkinson (14) which examines the prevalence rates of psychiatric disorders in men with chronic low back pain (CLBP) compared to a control group of men with chronic low back pain. This case-control study had 97 patients with chronic low back pain that were matched with 49 healthy volunteers on age and socioeconomic position. The study used structured diagnostic interviews and DSM-III criteria to assess the prevalence rates. Their results showed that compared to controls, men with CLBP had a significantly higher lifetime rates of major depression (32 percent vs. 16 percent) and a major anxiety disorder (30.9 percent vs. 14.3 percent). In addition, the six-month point prevalence of major depression was also significantly higher for men with CLBP. They also looked at other types of psychiatric illnesses, but those types are outside the scope of this paper. Results of this study are overshadowed by study’s biases and the possibility of confounding variables. The fact that the patients were only males and were from a Veterans Administration Hospital greatly limits the generalizability of the results from this study. Males with CLBP might have very different ways of dealing with pain compared to females. The authors don’t address the male only issue but they did address the issue regarding generalizability of VA hospital patients with the general population. They acknowledge the limitations of their study but at the same time they quote a study that compared characteristics of pain patients across different geographic sites and socioeconomic strata and found no differences between veteran and non-veteran chronic pain patients in rates of psychiatric histories or treatments. The relatively large discrepancy between the number of patients (97) and the number of controls (47) that were matched together should be questioned. How did they match all the controls to the patients if there were 50 fewer control volunteers? With 50 more patients than controls, the probability of the patients having a greater distribution of psychiatric illness would also be elevated. The authors of this study didn’t address the possibility of confounding variables being responsible for their results. Because of the potential detrimental influence of smoking and work-related risk factors on low back pain, the authors needed to make adjustments for these possible confounders, either in the matching process or in the statistical analysis. In defense of the authors, smoking and certain work related risk factors might not have been widely known in the scientific community when this study was performed. Also because of the biases and possible confounders present, the authors should have included odds ratios in their analysis to give me more confidence in their results.
Overall, this study had multiple flaws.

The next paper by Polatin (15) also examines the prevalence rates of psychiatric illness in patients with chronic low back pain (CLBP). Unlike the previous paper by Atkinson JH, this paper evaluates both males and females, specifically 134 and 66 respectively. This aggregate observational study used structured clinical interviews from the DSM-III-R and self-report questionnaires to make their diagnoses for both lifetime and current prevalence rates. Out of the 200 CLBP patients evaluated, 77 percent of them met lifetime diagnostic criteria for Axis 1 psychiatric disorders (clinical syndromes like major depression) and 59 percent demonstrated current symptoms for at least one psychiatric disorder. The most common of these disorders were major depression, substance abuse and anxiety disorders. They also reported that those patients with a positive lifetime history for psychiatric syndromes, 54 percent of those depression and 95 percent of those with anxiety disorders had experienced these syndromes before the onset of their back pain. Based on the methodology described in this study, it was very well done, but it did contain some biases and possible confounders. In this type of study where diagnoses are made through a patient interview, there exists a certain degree of error in the patients' ability to recall their past history accurately. And since it is the patients' recollections, which form the basis for the diagnoses and therefore the prevalence rates, the authors need to acknowledge this recall bias in their results. The possibility is especially important when the authors reported the prevalence of the premorbid psychiatric illnesses in reference to the onset of LBP. It is very difficult to determine a temporal relationship in this case when the study is cross-sectional as opposed to prospective type studies. It would have been appropriate for the authors to have addressed this issue in the paper. Caution is warranted in interrupting the results of this study because of the fact it did not contain a control group. A control group that was matched for age, sex and work related risk factors would have given the results much more merit and made the results more generalizable to the target population. However, it is acknowledged that these types of studies are much more expensive and time consuming. The authors did provide general population estimates on the prevalence rates of several psychiatric illnesses as a means of comparison against their rates. They also provided references that showed similarities between their rates and other studies with similar groups examined. However, as a reader of this study, we didn't have any information about the demographics (except for sex) of their group of patients to see if their group was comparable to other groups in the other studies they cited. For instance, was their group of patients' representative of other groups in age?

The last article reviewed is a large population survey by McWilliams (16) and colleagues who examined the prevalence rates of individuals with depression and anxiety in three pain conditions: arthritis, migraine and back pain. This study used data from the Midlife Development in the United States Survey (MIDUS) which consisted of 3,032 adults aged 25-74 years in the United States population. The survey was conducted by phone in the first stage and by using two mailed questionnaires in the second stage. The MIDUS psychiatric diagnoses were based on the Composite International Diagnostic Interview-Short form (CID1-SF) scales. The MIDUS participants provided reports regarding medical conditions experienced over the past year including the three condi-
tions listed above. Results showed there was a positive association between back pain and depression and back pain and generalized anxiety disorder (GAD) with odds ratios of 1.87 (1.49, 2.36) and 2.54 (1.67, 3.85) respectively. These statistically significant results showed that depression and GAD were more common in those individuals who had back pain than those who didn’t have back pain. A statistically significant and positive association also existed when the associations were adjusted (by multiple logistic regression analysis) for demographic variables (i.e. gender, race, education and age) by themselves and when these demographic variables were added with other pain conditions. When the associations were adjusted for demographic variables, pain conditions and the presence of other medical conditions, the back pain and GAD association lost its positive association and was not statistically significant. Back pain and depression retained its positive association and was still statistically significant. This study was very well done especially in how they accounted for a variety of confounding variables (by regression analysis) that might affect the positive associations seen in this study.

As with any study of this design, we have to pay attention to the possible biases that exist. The biases that might affect how one interrupts these results are the number of non-responders to the telephone interviews and postal questionnaires and the potential for recall bias among the responders. From both stages of data collection, the overall total of non-responders was at 60.8 percent. One has to wonder how different the non-responders were in comparison to the responders and would this difference affect the study’s results. A certain degree of recall bias exists with these types of studies and there is the possibility of participants forgetting to mention certain facts related to their medical history that occurred over the last year. Whether this recall bias would have altered the results of the study is unknown. There were other limitations to this study that had to do with the narrow focus and inadequate number of questions the survey and interview contained. The authors acknowledged these limitations. Due to the above listed possible biases and other confounding variables and limitations, one must use caution in drawing any firm conclusions about causality in this study to individuals.

SUMMARY AND CONCLUSIONS

Based on the literature presented in this paper, psychological distress (anxiety and/or depression) can play a significant factor in causing back pain. The five articles reviewed showed a positive relationship between back pain and psychological distress. Two of these articles at least suggested a temporal relationship where psychological distress was pre-existing and back pain was secondary. And out of these two articles, one researcher (Croft, PR) found that symptoms of psychological distress in individuals without back pain predict the subsequent onset of new episodes of low back pain. These five articles give support to the psychological distress component of the relatively new psychosocial model to back pain in contrast to the traditional structural model of spinal disease. Even though the psychological distress component demonstrates new and potentially useful information, more analytic epidemiological studies need to confirm the results of these reviewed studies perhaps in different locations and populations.
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