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# A Survey of College Students with and without Low Back Pain: A Comparison of Risk Factors

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A SURVEY OF COLLEGE STUDENTS WITH AND WITHOUT LOW  
BACK PAIN: A COMPARISON OF RISK FACTORS

by

Carrie Bristow  
Erika Buckhouse  
Jessica Nelson  
Bachelor of Science in Physical Therapy  
University of North Dakota, 2001

A Scholarly Project

Submitted to the Graduate Faculty of the  
Department of Physical Therapy

School of Medicine

University of North Dakota

in partial fulfillment of the requirements

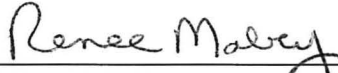
for the degree of

Master of Physical Therapy

Grand Forks, North Dakota  
May  
2002



This Scholarly Project, submitted by Carrie Bristow, Erika Buckhouse, and Jessica Nelson in partial fulfillment of the requirements for the Degree of Master of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

  
\_\_\_\_\_  
(Graduate School Advisor)

  
\_\_\_\_\_  
(Chairperson, Physical Therapy)

## PERMISSION

Title            A Survey of College Students With and Without Low Back Pain:  
                    A Comparison of Risk Factors

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Signatures Jessica Nelson

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Date December 20, 2001

## TABLE OF CONTENTS

LIST OF TABLES .....	vi
ACKNOWLEDGMENTS .....	viii
ABSTRACT .....	xiii
CHAPTER	
I    INTRODUCTION .....	1
Problem Statement .....	3
Purpose of Study .....	4
Significance of Study .....	4
Research Questions .....	5
II    LITERATURE REVIEW .....	6
Smoking .....	8
Alcohol Consumption .....	9
Obesity .....	10
Psychological Factors .....	11
Physical Actcivity .....	14
Work Related LBP .....	15
Treatment of Low Back Pain .....	16
Summary .....	18
III   METHODOLOGY .....	20

	Subjects .....	20
	Survey Construction .....	21
	Procedure .....	21
	Data Analysis .....	22
IV	RESULTS .....	24
	Respondents' Profile .....	24
	Research Question #1 .....	26
	Research Question #2 .....	30
	Research Question #3 .....	38
V	DISCUSSION .....	42
	Limitations of Study .....	47
	Suggestions for Future Studies .....	48
	Clinical Implications .....	49
	Conclusion .....	53
	APPENDIX A .....	54
	APPENDIX B .....	61
	REFERENCES .....	67

## LIST OF TABLES

Table		Page
1.	Participants Ages in Frequency and Percentage . . . . .	25
2.	Job Classifications in Frequency and Percentage . . . . .	26
3.	Number and Percentage of College Students with a History of Low Back Pain . . . . .	27
4.	Point Prevalence: Number and Percentage of College Students with Current Low Back Pain . . . . .	27
5.	Lifetime Incidence: Number and Percentage of College Students with Current and Past History of Low Back Pain . . . . .	27
6.	Frequency and Percentage of How Long College Students Have Experienced Low Back Pain . . . . .	28
7.	Frequency and Percentage of How Often College Students Have Low Back Pain . . . . .	29
8.	Frequency and Percentage of Specific Symptoms Reported by College Students with a Current and/or Past History of LBP (n ≥ 306) . . . . .	29
9.	Rank of Unhappiness/Depression as Compared Between College Students Without Low Back Pain Ever and Those with Current or Past Low Back Pain . . . . .	30
10.	Amount of Time College Students Spent Performing Aerobic Activities in Frequency and Percentage . . . . .	31
11.	Aerobic Activity Level as Compared Between College Students Without Low Back Pain Ever and Those with Current or Past Low Back Pain . . . . .	32

Table		Page
12.	Amount of Time College Students Spend Sitting on a Daily Average in Frequency and Percentage . . . . .	32
13.	Amount of Time Spent Sitting Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain . . . . .	33
14.	Number and Percentage of College Students Who Consume Alcohol . . . . .	33
15.	Alcohol Consumption Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain . . . . .	34
16.	Cigarette Smoking Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain . . . . .	34
17.	Obesity Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain . . . . .	35
18.	Repetitive Daily Activities in College Students Compared Between Those with and Without Current Low Back Pain .	36
19.	Repetitive Daily Activities Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain . . . . .	36
20.	Frequency and Percentage of Average, Daily Mental Stress Levels in College Students . . . . .	37



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I am so smart: "SMRT."

Erica Buckhouse

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## ABSTRACT

Many people suffer from low back pain. The lifetime incidence of low back pain has been widely studied in the general population. Previous research has found risk factors that have been correlated with an increase in low back pain. Individuals with low back pain seek different sources of treatment; outcomes of treatments vary. This survey targeted younger adults, specifically college students of ages 18 to 26. The results of this survey attempt to answer these three research questions: 1) What is the lifetime incidence of LBP in young adults ages 18 to 26? 2) In college students, is there a significant relationship between known risk factors and LBP? 3) In those who experience LBP, how many receive treatment and by which disciplines?

Surveys were administered to college students enrolled in general education classes at the University of North Dakota. Each student was asked to complete the four-page survey that contained a variety of questions in regard to LBP. A total of 406 surveys were returned. Data from all students ages 18 to 26 were compiled for the results.

The lifetime incidence of LBP in these students was found to be 77.5%. Unhappiness/depression was the only risk factor found to be significantly correlated with LBP. Treatment for LBP was sought by 34.9% of those with LBP.

Chiropractors were the primary choice of treatment for LBP (69.4%) in these young adults. Only 25.9% sought treatment from a physical therapist.

This high lifetime incidence of LBP in young adults brings to attention a neglected sector of the population. This study alerts health professionals to an underserved population that could be targeted with wellness and prevention strategies to possibly prevent chronic LBP as one ages.

## CHAPTER I

### INTRODUCTION

Low back pain is defined as “a symptom with no external standard by which its presence can be validated, the symptom being what the patient reports.”<sup>1</sup> Approximately 10 million people are experiencing low back pain (LBP) today in the United States.<sup>2</sup> Low back pain affects 70 to 80% of adults ages 45 to 60. In Britain and the United States, it has been found that about 20% of working men are afflicted by back pain each year.<sup>1,3</sup> Back pain may not be life-threatening, but it can certainly limit daily activities to the point of affecting one’s quality of life.

Most patients presenting with low back pain to a health care professional are between the ages of 35 and 45.<sup>4</sup> About 50% of young adults, ages 18 to 29, have had back pain at some point in their lives. Numerous studies have been directed at estimating the prevalence of low back pain in the general population, and many have found it is significantly lower in young adults.<sup>1,2</sup>

In the United States, total expenditures associated with back pain range from \$20 to \$50 billion each year. Sixty-seven percent of this cost is related directly to lost time and productivity in the work place. Liberty Mutual found that 33% of all workers’ compensation costs stem from LBP.<sup>3</sup> The Eastman Kodak Company reported that over four hours per person per year were lost because



of back pain and that disabling injuries to the back were increasing in frequency at a faster rate than any other injury. Thirty-five to forty-five percent of employees at various companies visit their on-site medical departments, commonly staffed by a registered nurse, for complaints associated with LBP.<sup>5</sup> Companies and industries have implemented ergonomics classes and fitness club memberships into their employee training and benefit packages with the hope of lessening the costs associated with LBP.

Different structures in the low back are potential sources of pain, including disks, muscle fibers, and nerve roots. Clinicians often have a difficult time making an accurate diagnosis about the cause of low back pain, with the inability to accurately identify the source of pain in 80% to 90% of clients. However, many treatment options are available to back pain sufferers. Health professionals such as chiropractors, physicians, and massage therapists provide intervention for low back pain. Over-the-counter medicines, such as aspirin, are also popular treatments. It is agreed upon by nearly all health professionals that posture and lack of physical activity are major contributors to LBP, with prevention being the key to relief of pain.<sup>3,4</sup> Furthermore, smoking,<sup>6-11</sup> alcohol consumption,<sup>12-13</sup> obesity,<sup>10,11,14</sup> stress, depression, and other psychological factors,<sup>9,10,15-21,30,31</sup> sedentary lifestyle,<sup>6</sup> improper lifting techniques,<sup>22,23</sup> age,<sup>1,2,4</sup> and gender<sup>1,3,4</sup> have all been linked with low back pain; many studies have examined these risk factors to determine if they are indeed predictors of LBP.

Physical therapists generally are not the first professionals that patients seek for help when suffering from back pain.<sup>24</sup> Referrals to physical therapists for the treatment of low back pain come from physicians, ergonomic training facilities, and fitness centers. In order to provide the greatest level of care to patients, treatment should be directed at finding the source of pain, treating the injured tissue, and preventing re-injury. These are all components which physical therapists address. Currently, insurance companies will not reimburse patients for medical costs from physical therapy without a physician's referral. This prevents patients seeking out physical therapists as a direct treatment option.

#### Problem Statement

The lifetime incidence of LBP has been widely studied in older adults; fewer studies exist examining the lifetime incidence in the young adult population. Finding a high lifetime incidence of low back pain in young adults may alert health professionals and the general public to new information that may alter the course of chronic back pain and its intervention.

There are many risk factors which have been identified and associated with LBP; however, these studies have usually examined very wide age ranges or age ranges not including young adults (ages 18 to 26). Thus, what has been correlated to be risk factors of LBP in middle-aged and older adults has been generalized to be the same in young adults when, in fact, age may be the primary determinant of whether or not these risk factors affect an individual's level of back pain.

There is also a common misconception that all young adults are strong and healthy. Health professionals, the media, and insurance companies practically ignore young adults' pain complaints. Prevention has been identified as the best way to decrease associated costs with back pain. Yet, care has not been directed at preventing or decreasing back pain in younger individuals.

#### Purpose of Study

The main purpose of this study is to determine the lifetime incidence of low back pain in a sample of college students. This study will also examine the relationship between LBP and previously recognized risk factors as they relate to college students ages 18 to 26. Different interventions for LBP used by these college students will be identified. If no significant relationship is found to exist between LBP and previously identified risk factors, alternative potential causes, and methods of prevention for LBP will be explored.

#### Significance of Study

By looking at the lifetime incidence of LBP in college students, our study may help physical therapists reach an underserved population: the young adult. This study may also alert health care professionals such as physicians and chiropractors to the fact that young adults do suffer from a significant amount of back pain and their complaints should be taken seriously. Insurance companies and employers are constantly looking for ways to cut back on costs associated with payments for LBP treatment; targeting a generally ignored sector of the population to stop back pain, particularly the future working class, could reduce the number of older adults who suffer, thereby reducing costs. Knowledge of

the lifetime incidence may help young adults with LBP to know they are not alone in their suffering. Young adults may feel they have no options but to live with the pain.

Risk factors for LBP have been identified throughout the general population. This study will determine if the same risk factors significantly correlate with LBP in college students. Risk factors that are found to correlate with young adults' LBP may be modified and aid in recovery and prevention of future LBP.

Interventions for LBP are numerous. Studies have looked at the kinds of treatments that the general population seeks. This study will look at the treatment options that college students seek and the number of college students who contact a health professional concerning their LBP. Through research, some interventions have been found to work better than others at decreasing a patient's pain. Our study will examine different interventions to find which ones have been proven to be most helpful, along with ways to possibly direct interventions for college students with LBP.

#### Research Questions

1. What is the lifetime incidence of LBP in young adults ages 18 to 26?
2. In college students, is there a significant relationship between known risk factors and LBP?
3. In those who experience LBP, how many receive treatment and by which disciplines?

## CHAPTER II

### LITERATURE REVIEW

Lifetime incidence of low back pain (LBP) has been estimated to range from 11% to 84%.<sup>25</sup> One particular study of 1455 adults with and without current LBP reported lifetime incidence rates of 59% and an average annual prevalence of 41%.<sup>8</sup> A study of 907 subjects found that 15% suffered from chronic back pain. Studies report that most patients with LBP range in age from 35 to 45 years. Onset of symptoms in these individuals typically represents the culmination of a chronic injury or what some would call “cumulative trauma injury.”<sup>26</sup> Other research studies have shown that low back pain exists even in the very young population. One study of 29,424 twins suggests 7% of 12-year-old participants had experienced low back pain at some point in their lives; this number increases to 67% by age 41.<sup>27</sup> A steep incline in reported prevalence rates occurred in girls ages 12 to 13 and boys ages 13 to 14; these estimates surpassed 50% in 18-year-old females and 20-year-old males. In a study of 96 children ages 10 to 19, 51% had a history of LBP, with 12.3 years the mean age of first occurrence.<sup>28</sup> In a review of numerous studies, Loney and Stratford<sup>2</sup> state that younger patients (ages 20 to 35) had a lower prevalence rate of LBP. One study found no clear association of acute LBP with increased age. But severe, debilitating LBP did show an

increase with age.<sup>22</sup> LBP is a common problem among persons of all ages and etiology is often difficult to identify; it is, therefore, necessary for purposes of intervention and prevention to recognize risk factors and possible causes of this potentially debilitating condition.

Several factors have been identified and studied as possible causes of LBP. Medical literature is readily available in reference to the roles these factors play in the development of LBP, though researchers are not always in agreement. This research is incomplete, however, as studies on low back pain have largely focused on the middle-aged and elderly segments of the population. There is little information available in literature regarding the incidence, prevalence, causes, diagnosis, treatment, and prognosis of low back pain in the young adult. Loney and Stratford<sup>2</sup> report that “there is confusion in the literature with respect to the terms ‘lifetime incidence’ and ‘lifetime prevalence’.” For this reason, we have decided to define these terms as Loney and Stratford reported as the following: *Lifetime incidence = The total number, or percent, of people who have or have had LBP during their lifetime. Point prevalence = The number of people reporting LBP on the day of the survey.* Only a small portion of research has studied low back pain in children and adolescents. Studies addressing factors related to low back pain, specifically in young adults between the ages of 18 to 26, as in our study, are extremely rare if they exist at all. While the risk factors previously identified by researchers are valid in the populations they have tested (i.e., elderly, middle-aged, or children),

it is virtually unknown whether the same factors apply to the young adult age group.

Several factors have been studied and documented regarding possible causes or risk indicators linked to low back pain. Those most commonly identified in literature are smoking,<sup>6-11</sup> alcohol consumption,<sup>12,13</sup> obesity,<sup>10,11,14</sup> stress, depression and other psychological factors,<sup>9,10,15-21,30,31</sup> activity level,<sup>6</sup> and LBP related to the work environment.<sup>22,23</sup> Other risk factors identified are spine geometry, increased lumbar lordosis, mechanical stresses, and repetitive heavy lifting;<sup>6</sup> these factors are not reviewed in this study due to difficulty of accurate assessment via our method of self-reported survey.

### Smoking

The general consensus among researchers shows there is indeed a significant link between smoking and LBP. One survey of 1221 men ages 18 to 55 found smoking significantly associated with episodes of LBP.<sup>6</sup> Forty-four percent of respondents were smokers at the time of the study. Of these, 39.6% had no complaints of LBP while 53% suffered severe LBP.

It is important to note, however, that a “significant link” does not necessarily imply causation. While most studies show a positive correlation between smoking and LBP,<sup>6-11</sup> Leboeuf-Yde discusses in her literature review that smoking “should be considered a weak risk indicator and not a cause of low back pain.”<sup>7(p1463)</sup> Another study by Leboeuf-Yde, et al<sup>8</sup> found that though there was a definite link between smoking and LBP which increased with the frequency and duration of the LBP, the link was unlikely to be causal; that is,

smoking does not cause LBP. Though it may not be accepted as a direct cause, smoking has been linked to physical conditions such as aortic atherosclerosis and chronic bronchitis which may, in turn, be linked to the onset or persistence of low back pain.<sup>29</sup> Leboeuf-Yde, et al<sup>8</sup> further suggest smoking affects vertebral blood supply through vasoconstriction, arterial atheromatous changes, or both. This may lead to hypoxia and degenerative changes in the spine with consequent back pain.

The matter of whether there is a dose-response relationship between smoking and LBP has been debated. A study of 29,424 twins found a positive association between smoking and LBP that was strongest with LBP of long duration.<sup>8</sup> However, no dose-response correlation was noted. Other studies suggest greater numbers of cigarettes smoked corresponds with increased intensity of LBP,<sup>10</sup> and smokers with a 50-pack-year history had more than doubled risk of LBP over a non-smoker.<sup>11</sup>

While smoking has largely been linked to LBP, it appears cessation of smoking does not lessen the intensity or duration of low back pain. Therefore, while it may be beneficial for the overall health of the smoker, cessation of smoking should not be considered a method of treatment for low back pain.<sup>8</sup>

#### Alcohol Consumption

Studies by Leboeuf-Yde<sup>12</sup> and Sandstrom<sup>13</sup> state there is no correlation between alcohol consumption and LBP, although “well-designed studies are lacking.”<sup>12</sup> Researchers have theorized possible links between alcohol consumption and LBP, including alcohol-induced incoordination making the



spine more vulnerable to injuries. Also, excess alcohol consumption is associated with social and psychological problems that may be important in the development of LBP. These aspects will be addressed in the section “Psychological Factors.”

### Obesity

In research, obesity is typically measured using the “body mass index,” or BMI, defined as “mass in kilograms divided by the square of the height in meters.”<sup>11</sup> In general, BMI < 20 is considered underweight, 20 to 24 is normal weight, 25 to 29 is overweight, and BMI > 29 is considered obese.<sup>8</sup> Some researchers also use one or four site skin-fold measurements with a caliper to determine fat mass.

Studies generally have shown some degree of correlation between obesity and LBP, though it may not be a prognostic factor.<sup>10</sup> In a study by Garzillo and Garzillo,<sup>11</sup> a relationship between obesity and LBP was found only in the upper quintile of obesity; that is, BMI > 29. This study further states weight loss may be attempted as treatment for LBP in obese individuals, but treatment is ineffective if initial BMI is < 29. A study by Levangie<sup>23</sup> reported the same findings.

A review of 56 original research reports on 65 individual studies concerning body weight and LBP described weight as a “weak risk indicator,” with 32% reporting a statistically significant link.<sup>14</sup> However, this study could not show a causal link due to insufficient data.

Other factors that must be considered when evaluating the relationship between obesity and LBP are the inaccuracy of self-reported figures and psychological issues. Many of the studies reviewed relied upon subjects to self-report their heights and body weights. Each person's basal metabolic index was figured from these reports. It is possible, therefore, that information included in studies of this topic may not be entirely accurate due to false reporting, either knowingly or unknowingly, on the part of the subject.

It also must be considered that the incidence of psychological issues, such as stress and depression, may be greater in this segment of the population than in others. This warrants further evaluation as psychological factors are in themselves risks for LBP.

#### Psychological Factors

Studies have shown a positive link between LBP and psychological and stress factors.<sup>9,10,15-21,30</sup> In fact, the prevalence of major depression may be three to four times more likely in the patient with chronic LBP than in the general population,<sup>16</sup> and > 50% of patients with chronic LBP may have significant depression. The severity of the pain has been related to the degree of depression and number of pain sites.<sup>15</sup> Furthermore, the depression associated with LBP is often atypical<sup>21</sup> and the patients may not appear depressed. Instead, they may present with a sort of "masked depression," making recognition and diagnosis much more difficult. Depression and anxiety neuroses are the most common psychological disorders associated with LBP;

other psychological disorders occur with the same frequency as in the general population.<sup>15</sup>

With the high rate of comorbidity between LBP and psychological syndromes, knowledge about the existence of a temporal relationship, if any, could be very useful to the practitioner. An important study by Polatin, et al<sup>30</sup> was able to do just this. Two hundred patients with chronic LBP were assessed for current and lifetime psychiatric syndromes using an interview structured to make DSM-III-R diagnoses. Seventy-seven percent of those interviewed met lifetime diagnostic criteria and 59% demonstrated current symptoms for at least one psychiatric diagnosis. Major depression, substance abuse, and anxiety disorders were the most common diagnoses. The base rates for all psychiatric illnesses were significantly higher in this group of persons with chronic LBP than in the general population. Of those with a positive lifetime history of psychiatric illness, 55% had developed depression prior to the onset of chronic back pain.<sup>15,17,30</sup> Ninety-four percent of those with a history of substance abuse and 95% of those with anxiety disorders experienced these syndromes prior to onset of their LBP.<sup>30</sup> Therefore, certain syndromes (i.e., substance abuse and anxiety disorders) tend to precede chronic LBP while others (depression) may occur either before or after onset of LBP. These researchers suggest clinicians should be aware of potentially high rates of emotional distress in chronic LBP patients, and referral to mental health professions is warranted to maximize treatment outcomes.

Other researchers claim that while not necessarily causal, depressive signs and symptoms are good predictors of five-year development of clinically identifiable musculoskeletal symptoms in both males and females.<sup>20</sup> The physiological mechanisms leading to the appearance of these symptoms are unknown. This finding is not reciprocal though, as musculoskeletal symptoms were not found to be indicative of future depressive symptoms. However, a reciprocal relationship was believed to exist between stress and musculoskeletal symptoms.

Back pain has been found to be associated with stress related to life events, family, and work environments.<sup>18</sup> Nagi, et al<sup>18,29</sup> found LBP was most likely to occur with frequent job changes and in the first year at a new job. In the work environment, increased levels of pain were associated with lack of close relationships with peers, physical comfort, and job clarity.<sup>18</sup> Increased work pressure was related to decreased pain and less depression. Feuerstein, et al<sup>2</sup> theorized the increased work demands may have provided a distraction for the worker, thus diverting attention from distress and pain.

Stressors related to family include family conflict or control issues; loss of spouse through divorce, separation, or death; and level of marital satisfaction.<sup>18</sup> Feuerstein, et al<sup>18</sup> suggested family conflict led to increased pain via an increase in psychological distress. Familial independence was related to a decrease in distress but an increase in pain. The researchers felt that a member of a family with this structure may receive little support and attention in

regard to his or her pain; therefore, pain behaviors become a mechanism by which to achieve such support.

### Physical Activity

LBP relating to level of physical activity is another risk factor that has been studied and reviewed in medical literature. A study of 1221 men, ages 18 to 55, assessed past and present level of participation in athletic activities and compared that data to past and present ratings of LBP.<sup>6</sup> This study found that during adolescence, those with severe back pain participated in athletics to the same extent as those with mild or no LBP. Those with moderate, mild, or no back pain continued in their general level of physical activity, while those with severe back pain were less active in later years. There was a tendency, however, for subjects with moderate LBP to have a greater level of current sports activity than those persons who were asymptomatic or who were experiencing severe LBP.

A literature review by Leino<sup>31</sup> found that those who took part in sports had less low back pain than those who did not. Leino's study found that physical activity was not associated with increased or decreased LBP. He did, however, find that men who participated in an activity > 5 years showed an increase in LBP. The author states that this may be due to increased incidence of osteoarthritis in patients with habitual participation in sports. Other studies also found no significant relationship between activity and LBP during leisure time.<sup>22,23</sup> In one particular study, it was found that 71% of those with severe

LBP were not active during their leisure time compared with 51% among the rest of the subjects.

A study of children ages 10 to 19 looked at the presence of LBP related to age, back strength, and physical activity.<sup>28</sup> This study found that the history of LBP was 51% in this age group with the prevalence of LBP in the past year at 35%. Researchers concluded LBP in children was more common with increased physical activity and stronger back flexors.

#### Work Related LBP

Kuritzky<sup>26</sup> has classified the stages of back pain as acute (less than 3 weeks), subacute (3 to 12 weeks), and chronic (greater than 3 months). According to this source, most acute low back pain is mechanical in origin and has a more favorable outcome than back pain associated with a secondary origin or pathology. A low back that has been chronically weakened by a lifetime of abnormal postures or poor lifting and bending habits may require only a slight insult to deliver significant pain. A sedentary flexed posture produces stress that allows for disk herniation and other pathologies that produce pain. Weak back extensors and other spinal musculature as well as poor posture and general muscle weakness are all factors that contribute to the progression from an acute low back pain episode into a chronic pain cycle.

A 1992 study in *Spine* examined LBP in construction workers to determine whether specific ergonomic factors are associated with the occurrence of LBP to a greater degree than psychosocial factors.<sup>22</sup> It was found that 92% of the workers had LBP at some time during the past 12 months.

Longer durations of stooping and kneeling were found to be associated with LBP in all age groups. Amount of time spent sitting (including sitting longer than half a day) and sitting postures were not found to be related to LBP in these workers. In consideration of psychosocial aspects, LBP was increased with dissatisfaction of their jobs only in workers < 30 years of age. When workers were grouped into categories of heavy work and light work, the heavy workers had significantly higher occurrences of low back pain.

Levangie<sup>23</sup> found that subjects who spent greater than one hour per day in a car experienced greater LBP. However, there is conflicting evidence as to the rationale for this relationship. Some researchers suggest the LBP comes from increased time spent sitting, while others suggest whole-body vibrations from the car lead to increases in LBP. Levangie also found that repetitive lifting was associated with LBP and the greater amount of weight lifted often correlated with a higher incidence of LBP. On the other hand, lifting heavy objects on a rare occasion was not related to LBP.

#### Treatment of Low Back Pain

Cote, et al<sup>24</sup> found that only 25% of individuals with LBP visited a health care professional, and they typically did so only after the pain had become disabling. The types of health care providers consulted by those with LBP were the following: 32% contacted medical doctors, 29% consulted with chiropractors, 7% contacted massage therapists, and 2% consulted with physical therapists. Eight percent of those with low back pain sought out help from both medical doctors and chiropractors, while 5% contacted both medical

doctors and physical therapists. The researchers also found that those who saw a chiropractor alone had overall better physical health and functioning, not including the low back pain, than did those who saw a doctor alone. Patients with co-morbidities and limits in activities of daily living were most likely to seek out a medical doctor. The authors of this study also suggest that the reason patients see medical doctors and chiropractors most often is because they are the only health professionals reimbursed by insurers without a referral.

A wide range of treatment options are available for those who suffer from LBP. Acetaminophen has been found in clinical trials to perform as well as NSAIDs (nonsteroidal anti-inflammatory drugs) much of the time. However, the patient does not usually take a full therapeutic dose (4000 mg/day) of acetaminophen.<sup>26</sup> Pope, et al<sup>32</sup> found that there was no significant difference in the physical outcomes (ROM, strength, pain) between treatments of manipulation, massage, corset application, and transcutaneous muscle stimulation.

A study of 148 subjects in Switzerland attempted to determine the effectiveness of three different types of treatment on low back pain.<sup>33</sup> Individuals involved in the study were placed in one of three groups for purposes of comparison. Persons in the first group received individual physical therapy sessions lasting half an hour with focus on improving functional capacity, instruction on ergonomic principles, and a home exercise program. Persons in the second group received one-hour therapy sessions for muscle reconditioning using devices placed on the trunk musculature. The third group



participated in an hour of low-impact aerobics in groups of 12 subjects. This consisted of a 20-minute warm-up of whole body stretching and aerobic activity, following by 20 to 30 minutes of specific trunk and leg exercises, with the last 15 minutes for stretching and relaxation exercises, for a total of 55 to 65 minutes of activity. The three treatment methods were proven to be equally effective in reducing pain. Fifty-seven percent of the subjects reported decrease in pain and 49% showed improvement in function following the study. However, in the year following the study, while the muscle reconditioning and aerobics groups experienced continued improvements, the therapy group showed a regression towards pre-therapy levels. The authors suggest that with individual therapy sessions, the patient did not have to directly overcome their fear of pain for they had constant reassurance and assistance from the therapist. They were also not solely responsible for reaching their goals as the other groups were. However, at the end of 12 months, the differences in each group were not significant. This study suggests that a combination of therapy and active independent exercises will help to decrease reoccurrence of LBP because of the different options that would be made available and easily accessible for the patient.

### Summary

The lifetime incidence of LBP in the young adult population has not been widely studied. Generally, it is expected that LBP increases with age and that only a small percentage of young adults suffer.

Several risk factors have been identified and associated with the occurrence of LBP in the general population. However, previous studies have not specifically examined the correlation of these risk factors with LBP in young adults.

Persons suffering LBP seek relief from several sources. Medical doctors and chiropractors are the primary sources of treatment, with medical and manipulation the most common interventions. Physical therapists are generally not the health professionals that people consult when suffering from LBP.

This literature review has discussed factors that have been correlated with the presence of LBP in other segments of the population. This study will attempt to show whether these factors indicate risk for LBP in the target population ages 18 to 26.

## CHAPTER III

### METHODOLOGY

For this study, college students at the University of North Dakota completed a survey consisting of several questions concerning low back pain and certain activities, moods, and behaviors that may or may not be associated with low back pain. Prior to dispersal of the survey, all aspects of this study were approved by the Institutional Review Board at the University of North Dakota, project number IRB-200104-218 (see Appendix A).

#### Subjects

The population included in this study consisted of college students currently enrolled in general education classes at the University of North Dakota. General education classes were selected for study based on their large numbers of students and greater likelihood of attaining a heterogeneous sample. Permission of each classroom's instructor and availability of the researchers during allotted time slots were additional factors affected subject selection.

Four classes were involved in the study and each student was given a questionnaire to fill out. A total of 404 completed surveys were returned by the students to the researchers.

## Survey Construction

Questions formulated for this survey were derived following an extensive review of medical literature and input from a UND faculty member from the Department of Physical Therapy. The research of medical literature included studies done on factors theorized to be linked to low back pain as well as review of related studies previously conducted. The survey utilized in this study consisted of 15 questions relating to both present and past low back pain and certain activities, moods, and behaviors commonly associated with low back pain. Specific aspects considered included type and duration of pain, occupation, treatment sought, smoking habits, alcohol consumption, postural/daily activities, stress level, and psychological factors. Survey format was a combination of ranked scales, open-ended questions, and choice of the most appropriate listed answer. A copy of the questionnaire can be found in Appendix B.

## Procedure

Collection of data began in April 2001 and was completed in May 2001. Following IRB approval, permission was requested of and granted by the professors and their respective departments to enter classrooms for survey distribution. Each student was provided a cover letter indicating the purpose of the study as well as its confidential nature. No names were attached to any survey as each student was assigned only a generic number for the purpose of data analysis. Also included in the cover letter were phone numbers and an address where the researchers could be contacted in the event of questions or

concerns. Surveys were administered in each classroom at a time agreed upon by the instructor and researchers. The survey took approximately ten minutes for each student to fill out and they were handed to the researchers upon completion.

### Data Analysis

Data from 406 undergraduate students were acquired and considered for analysis in this study. According to the University of North Dakota Student Profile for 2001-2002,<sup>34</sup> students ages 18 to 26 account for approximately 9,335 of all UND students or 79.4% of the entire student population. The average age of UND undergraduate students was 22.5 years. Therefore, while 406 surveys were collected, only data from students ages 18 to 26 were included in the actual analysis as this age group is better representative of the entire college population. Furthermore, it was felt by the researchers that older students are more likely to have low back symptoms resulting from different physical, social, and psychological factors than the college student of average age. Therefore, data from 396 surveys were analyzed statistically.

Data were entered into SPSS 10.0 program to be analyzed using traditional descriptive and analytical methods. The alpha level for all statistical analyses was set at  $\alpha = .05$ . Information from open-ended questions was tallied manually, categorized and discussed according to the frequency of the varying comments.

Results are available to all interested persons, including study subjects. The results may be found on the second floor of the Harley E. French Medical

Library located in the School of Medicine and Health Sciences on the UND campus.

## CHAPTER IV

### RESULTS

Low back pain questionnaires were administered to college students enrolled in general education classes at the University of North Dakota. A total of 406 completed low back pain (LBP) surveys were returned by the college students. Three hundred ninety-six surveys were used to compile the results of this study. Eight surveys were eliminated because the participants were not between the ages of 18 and 26. It was chosen by the researchers to only compile the data and report the results taken from the participants who were ages 18 to 26.

The data were entered into the computer and analyzed according to descriptive statistics. The open-ended questions were recorded and sorted into categories. Some survey questions were not answered by all participants and certain questions were to be answered based upon a history of LBP; therefore, the number of responses for questions vary. The results of this survey relative to the three main research questions are as follows.

#### Respondents' Profile

Of the 396 selected respondents ages 18 to 26, 44% (n = 176) were male and 56% (n = 220) were female. Age nineteen (n = 186) represented

47% of the sample size, with 81% of the sample age 20 or younger. See Table 1 for the frequency and percentage of participants' ages.

Table 1. Participants Ages in Frequency and Percentage

Age	Frequency	Percentage
18	71	18
19	186	47
20	62	16
21	34	9
22	12	3
23	18	4
24	4	1
25	4	1
26	5	1
TOTAL	396	100

The participants were divided into work classification groups according to their employment status (other than college student). They were put into five categories, college athlete, sedentary, light duty, medium duty, and heavy duty/manual labor, depending on what the researchers interpreted their job demands to be. The majority (69%) of the respondents were in the *light* or *medium duty* categories. (See Table 2.) One hundred eight-seven students were not employed.



Table 2. Job Classifications in Frequency and Percentage

Job Category	Frequency	Percentage
College Athlete	5	2
Sedentary	19	9
Light Duty	76	36
Medium Duty	68	33
Heavy Duty/Manual Labor	41	20
TOTAL	209	100

**Research Question #1: What is the lifetime incidence of low back pain in 18- 26-year-olds?**

The college students surveyed were asked to report any current LBP and/or any LBP in the past. The majority of the respondents, 73%, reported having LBP in the past, while 25% reported current LBP. Refer to Table 3 to see frequency and percentage of college students with a history of LBP and Table 4 to see frequency and percentage of college students with current LBP. When analyzed together, those with a current and/or past history of LBP ( $n = 306$ ), otherwise known as the lifetime incidence, represented 78% of the participants. Only 22% ( $n = 89$ ) reported never experiencing LBP. (See Table 5). Study participants who reported having current LBP indicated their pain had lasted from less than one week to ten years, with the mode being three years ( $n = 15$ ) of LBP. Table 6 reports the frequency and percentage of how long college students have experienced LBP.

Table 3. Number and Percentage of College Students with a History of Low Back Pain

Past History of LBP	Frequency	Percentage
Yes	289	73
No	106	27
TOTAL	395	100

Table 4. Point Prevalence: Number and Percentage of College Students with Current Low Back Pain

Current LBP	Frequency	Percentage
Yes	98	25
No	298	75
TOTAL	396	100

Table 5. Lifetime Incidence: Number and Percentage of College Students with Current and Past History of Low Back Pain

Current and/or Past LBP	Frequency	Percentage
Yes	306	78
No	89	22
TOTAL	395	100

The group with the past history of LBP was separated into acute (having LBP less than 3 months) and chronic (having LBP more than or equal to 3 months) low back pain groups. The results showed 80% (n = 78) of the college

Table 6. Frequency and Percentage of How Long College Students Have Experienced Low Back Pain

Time Experiencing LBP	Frequency	Percentage
Less than 1 week	4	4
2 weeks	4	4
1 month	2	2
2 months	9	10
4 months	1	1
6 months	2	2
9 months	1	1
1 year	10	11
2 years	14	15
3 years	15	17
4 years	10	11
5 years	11	12
6 years	5	6
7 years	1	1
8 years	1	1
9 years	1	1
10 years	1	1
TOTAL	92	100

students with LBP are experiencing chronic LBP and only 20% (n = 19) are experiencing acute LBP. Those who reported having current or past LBP (n = 306) were asked how often they experience this pain. As shown in Table 7, the respondents had to choose between the following answers: a few times per week, once a month, once a week, 2 to 3 times a week, 4 to 6 times a week, or constantly. Three hundred seven participants responded to this question. The mode, with the response of *a few times per year*, represented 40% (n = 22) of the sample. Another 40% experienced LBP one or more times per week.

Table 7. Frequency and Percentage of How Often College Students Have Low Back Pain

LBP How Often	Frequency	Percentage
Few times a year	122	40
Once a month	63	20
Once a week	57	19
2-3 times/week	34	11
4-6 times/week	20	6
Constantly	11	4
TOTAL	307	100

The respondents were then asked to describe their LBP as sharp, burning, dull ache, tingling, numbness, locking, and/or shooting. They were allowed to choose as many symptoms that applied. Table 8 shows the frequency and percentage for each LBP symptom as reported by the college students. Dull ache was the most frequently reported sensation ( $n = 232$ ) at 76% of the sample, and the second greatest symptoms reported was sharp ( $n = 103$ ) at 34%.

Table 8. Frequency and Percentage of Specific Symptoms Reported by College Students with a Current and/or Past History of LBP ( $n \geq 306$ )

Description	Frequency	Percentage
Sharp	103	34
Burning	21	7
Dull ache	232	76
Tingling	11	4
Numbness	15	5
Locking	37	12
Shooting	27	9

**Research Question #2: In college students, is there a significant relationship between known risk factors and low back pain?**

The only significant relationship found in this study was between college students who had current and/or past LBP and repeated lifting, twisting, or bending on an average daily basis. No other significant relationships were found between LBP groups and previously identified risk factors for LBP.

Respondents were asked to rank their feelings of unhappiness/depression in relation to their LBP on a scale of 1 to 4, with 1 being equivalent to *seldom/never* and 4 to *often or continuously*. The four categories were collapsed into two with a rating of 2 analyzed in the category *seldom/never* and a rating of 3 analyzed in the category *often or continuously*. (See Table 9.) There was no significant relationship found between the prevalence of LBP and feelings of unhappiness and depression as related to LBP,  $\chi^2 (1, 387) = 3.373, p = .066$ .

Table 9. Rank of Unhappiness/Depression as Compared Between College Students Without Low Back Pain Ever and Those with Current or Past Low Back Pain

Unhappiness/Depression	No LBP Ever	Current or Past LBP	Total
Seldom/never	81	257	338
Often/continuously	6	43	49
TOTAL	87	300	387

The study participants answered a question regarding the average amount of time spent per week performing aerobic activities. They were instructed to include fast paced sports such as basketball or swimming and also walking, running, biking, etc. They were asked to choose the most appropriate category for their activity level. Refer to Table 10 to see choices for aerobic activity and the frequency and percentage of each choice reported by respondents. The mode represented 43% of the respondents with the aerobic activity level of *30 minutes per day, 2 to 3 times per week*. Aerobic activity level was compared between those who reported current or past LBP to those who never experienced LBP (see Table 11). The results of a Pearson Chi-Square test showed no significant relationship between the prevalence of LBP in college students and aerobic activity level,  $\chi^2 (3, 395) = 1.233, p = .748$ .

Table 10. Amount of Time College Students Spent Performing Aerobic Activities in Frequency and Percentage

Aerobic Activity Level	Frequency	Percentage
Less than 30 min/week	75	19
30 min/day, 2-3 times/week	168	43
30 min/day, 4-5 times/week	104	26
30 min/day, 6-7 times/week	49	12
TOTAL	396	100

The questionnaire asked the participants to report how many hours on average they spend sitting per day; this included riding in a car, in a classroom, on the job, watching television, etc. Participants reported spending anywhere from 2

Table 11. Aerobic Activity Level as Compared Between College Students Without Low Back Pain Ever and Those with Current or Past Low Back Pain

Aerobic Activity Level	No LBP Ever	Current or Past LBP	Total
Less than 30 min/week	19	56	75
30 min/day, 2-3 times/week	40	128	168
30 min/day, 4-5 times/week	20	84	104
30 min/day, 6-7 times/week	10	38	48
TOTAL	89	306	395

to 18 hours of sitting per day on average. The respondents' answers were put into categories of 4-hour increments as seen in Table 12. The results showed a mode of 5 to 8 hours of sitting per day on average ( $n = 250$ ), representing 64% of the sample. Respondents were split into two categories for further analysis, those who sat 8 hours or less per day and those who sat more than 8 hours per day (see Table 13). Pearson Chi-Square test showed no significant difference between LBP groups in those who spent more or less than 8 hours of sitting per day on average,  $\chi^2(1, 390) = .116, p = .733$ .

Table 12. Amount of Time College Students Spend Sitting on a Daily Average in Frequency and Percentage

Hours Spent Sitting/Day	Frequency	Percentage
4 or less	29	7
5 to 8	250	64
9 to 12	93	24
More than 12	19	5
TOTAL	391	100

Table 13. Amount of Time Spent Sitting Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain

Time Spent Sitting	No LBP Ever	Current or Past LBP	Total
8 or fewer hours	64	214	278
More than 8 hours	24	88	112
TOTAL	88	302	390

Respondents were asked to report if they drank alcohol, and if yes, about how many alcoholic drinks they consume on an average weekly basis (see Table 14). Those who reported drinking alcohol, 80% (n = 316), were put into two categories. As seen in Table 15, participants were split into two groups, those who reported having less than or equal to 7 drinks per week and those who reported having more than 7 drinks per week. Pearson Chi-Square showed no significant relationship between LBP groups in those who consumed 7 or less alcoholic beverages per week and those who consumed more than 7 drinks per week,  $\chi^2 (1, 309) = .581, p = .446$ .

Table 14. Number and Percentage of College Students Who Consume Alcohol

Consume Alcohol	Frequency	Percentage
Yes	316	80
No	80	20
TOTAL	396	100



Table 15. Alcohol Consumption Compared Between College Students Without Low Back Pain and With Current and/or Past Low Back Pain

Consume Alcohol	No LBP Ever	Current or Past LBP	Total
≤ 7 drinks/week	39	156	195
> 7 drinks/week	27	87	114
TOTAL	66	243	309

Participants were also to report if they did or did not smoke cigarettes, and if yes, how many cigarettes they smoked per day on average. As with drinking alcohol, there was not significant relationship found between LBP groups in those who did or did not smoke cigarettes,  $\chi^2 (1, 395) = .738, p = .390$ . (See Table 16.)

Table 16. Cigarette Smoking Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain

Smoke Cigarettes	No LBP Ever	Current or Past LBP	Total
Yes	12	53	65
No	77	253	330
TOTAL	89	306	395

Basal metabolic rate (BMI) was calculated from the respondent's self-reported height and weight. Following a Pearson Chi-Square test, there was no significant relationship found between LBP groups in those who were obese or were not obese,  $\chi^2 (1, 377) = 3.094, p = .079$ . (See Table 17.)

Table 17. Obesity Compared Between College Students Without Low Back Pain and with Current and/or Past Low Back Pain

Calculated BMI	No LBP Ever	Current or Past LBP	Total
Obese	13	71	84
Not obese	72	221	283
TOTAL	85	292	377

The respondents who reported having current LBP were asked to report if they did any repetitive lifting, twisting, or bending on a daily basis. A total of 147 participants stated they do perform these activities on an average day and 249 stated they do not perform these activities (see Table 18). No significant relationship was found between having current LBP and performing repetitive lifting, twisting, or bending on a daily basis,  $\chi^2 (1, 396) = 2.547, p = .111$ . Repeated lifting, twisting, or bending activities were then compared between respondents with current and/or past LBP (see Table 19). A significant relationship was found between those who had current and/or past LBP and repetitive lifting, twisting, or bending on a daily basis,  $\chi^2 (1, 395) = 6.096, p = .014$ . Of the 306 respondents who reported current and/or past LBP, 123 are required to perform repetitive lifting, twisting, or bending in their daily activities.

The respondents, independent of whether they did or did not have LBP, described in their own words the daily activities that required them to repetitively lift, twist, and bend. Playing sports, such as “cheerleading,” “football,” and

Table 18. Repetitive Daily Activities in College Students Compared Between Those With and Without Current Low Back Pain

Lifting, Twisting, Bending	Current LBP	No Current LBP	Total
Yes	43	104	147
No	55	194	249
TOTAL	98	298	396

Table 19. Repetitive Daily Activities Compared Between College Students Without Low Back Pain and With Current and/or Past Low Back Pain

Lifting, Twisting, Bending	No LBP Ever	Current or Past LBPTotal	Total
Yes	23	123	146
No	66	183	249
TOTAL	89	306	395

“basketball” represented 25 of the respondents. Another 41 participants reported “working out” and “weight lifting” as the reasons for daily lifting, twisting, and bending. The majority of the respondents ( $n = 72$ ) reported their job required them to perform the repetitive daily activities. Descriptions given included “lifting heavy boxes at work,” “at work I lift people while twisting/bending,” “roofing,” and “digging, road work.” Eleven participants described activities performed at home and with their children, such as “housework, lawn work, caring for children,” “I have to lift and carry my 3-year-old son (38 pounds) quite a bit.” Another 14 participants reported “carrying

books” and “lifting bookbag” as the repetitive daily activities of lifting, twisting, and bending.

Study participants rated their average daily mental stress level on a scale of 0 to 10, with 0 being no stress at all and 10 being the most stress possible.

As seen in Table 20, the mode for both groups was a rank of 7, representing

Table 20. Frequency and Percentage of Average, Daily Mental Stress Levels in College Students

Rank on Stress Scale	Frequency	Percentage
0	6	2
1	17	4
2	25	6
3	44	11
4	44	11
5	66	17
6	57	14
7	78	20
8	48	12
9	9	2
10	1	1
TOTAL	395	100

20% (n = 78) of the respondents. The participants without LBP were compared between those with current and/or past LBP. For analysis purposes, the average daily mental stress scale was split into a low end, a rank of 1 to 5, and a high end, a range of 6 to 10 (see Table 21). No significant relationship was found between LBP groups and average daily mental stress levels,  $\chi^2(1, 394) = .208, p = .649$ .

Table 21. Low End of Stress Scale Versus High End of Stress Scale Compared Between College Students Without Low Back Pain and With Current and/or Past Low Back Pain

Mental Stress Level	No LBP Ever	Current or Past LBP	Total
1-5	47	155	202
6-10	41	151	192
TOTAL	88	306	394

**Research Question #3: In those students who experience low back pain, how many receive treatment, and by which disciplines?**

The participants who reported having or ever having low back pain were asked if they have ever or are currently receiving treatment for their LBP. As shown in Table 22, only 35% (n = 107) reported receiving treatment for their LBP. The respondents were then asked to choose the disciplines from which they have received treatment. They were to select all that applied. Many respondents had seen more than one health professional for their LBP. Their choices were as follows: medical doctor, physical therapist, chiropractor, masseuse, or other. The majority (n = 75), 69%, sought treatment for their LBP from a chiropractor, while only 26% (n = 28) received treatment from a physical therapist. Another 31% (n = 33) and 20% (n = 22) received treatment from a medical doctor and a masseuse, respectively (see Table 23).

Table 22. Frequency and Percentage of College Students Who Receive Treatment for Low Back Pain

Received Treatment	Frequency	Percentage
Yes	107	35
No	200	65
TOTAL	307	100

Table 23. Type of Treatment Sought by College Students for Low Back Pain in Frequency and Percentage

Discipline	Frequency	Percentage
Medical Doctor		
Yes	33	31
No	75	69
	108	100
Physical Therapist		
Yes	28	26
No	80	74
	108	100
Chiropractor		
Yes	75	69
No	33	31
	108	100
Masseuse		
Yes	22	20
No	86	80
	108	100
Other		
Yes	2	2
No	106	98
	108	100

If respondents had seen a health care professional for their LBP, they described in their own words what the health care professional considered to be the cause of their LBP. Nineteen responses were related to athletic activities, such as “sports injuries” or from “too much strain” with physical activities. Twenty-nine responses were related to posture and body mechanics. Descriptions given consisted of “poor posture,” “slouching,” “too much heavy lifting,” and “sleeping in a poor/incorrect position.” Participants (n = 39) also gave diagnostic-type descriptions for the cause of their LBP. These included “scoliosis,” “muscle cramps and pulled muscles,” “slipped disk,” “pinched nerves,” “back out of place,” “rotated SI (sacroiliac) joint,” and “muscle tightness from back to hips.” Another category, with 12 responses, consisted of past injuries such as “car accident” and “minor injury in past.” Ten persons reported “stress” and “tension” as the reason for their LBP. Two respondents did not know the health professional’s opinion or diagnosis for their LBP.

Participants with current or past LBP described in their own words the cause of their LBP. Many respondents thought the cause of their LBP was the same as what the health professional had said. Other participants had not seen a health professional for their LBP and, therefore, had their own thoughts of what caused their LBP.

Twenty-four respondents described their LBP as relating to athletic and physical activities. “Physical exercise” and “hockey and football” were a few of the reasons given for the cause of LBP in college students. The majority of the respondents (n = 57) indicated their LBP was related to posture and body

mechanics. A few descriptions were as follows: “bad lifting technique,” “poor posture,” “repetitive strenuous twisting and quick movements,” and “working out wrong.” Past injuries and car accidents represented six responses. Seven respondents reported “stress” as the reason for their LBP. Five respondents were unsure of the cause of their LBP.

The results of this study have shown there is no significant relationship between college students with current and/or past LBP and many previously identified risk factors for LBP. One factor, repetitive lifting, twisting, or bending on a daily basis, was found to be significant in college students with current and/or past LBP.



## CHAPTER V

### DISCUSSION

Data gathered from the results of this study may be utilized by practitioners of all disciplines to achieve an improved understanding of the existence and possible etiologies of low back pain (LBP) in the young adult population. The results of this survey are discussed in this chapter and possible explanations regarding those results are presented. Results are grouped according to the research questions as presented in previous chapters. Limitations and clinical implications regarding this study are discussed and recommendations for future studies are suggested.

#### **What is the lifetime incidence of LBP in 18- to 26-year olds?**

Previous research has suggested LBP occurs significantly less often in young adults.<sup>1,2</sup> Kuritzky states approximately 50% of persons age 18 to 29 have experienced LBP at some point in their lives.<sup>4</sup> However, in our survey, 77.5% of respondents ages 18 to 26 claimed to have experienced LBP either in the past or currently, with the point prevalence (those reporting LBP the day of the survey) being 24.7%. This shows a significantly greater incidence of LBP in young adults than was previously noted.

#### **In college students, is there a significant relationship between known risk factors and low back pain?**

Through statistical analysis, repetitive lifting, twisting, and bending were the only factors that provided a statistically significant link to the presence of LBP. Medical literature is generally conflicted as to whether these factors are significantly related to LBP.<sup>9,10,15-21,30,31</sup>

In this study, most subjects claimed their repetitive heavy lifting tasks were carried out at work. Others claimed sports, weight lifting, carrying books, and lifting young children as reasons for lifting, bending, and twisting. Low back pain related to lifting activities could be attributed to any number of factors not directly assessed in this survey, including body mechanics and postures, amount of weight lifted, number of repetitions, and minutes/hours per day spent lifting. It is likely a majority of those subjects who reported LBP associated with repetitive lifting activities do not lift using proper body mechanics. However, further research is needed to determine the specific reasons for the presence of LBP.

No other risk factors implicated by previous research were statistically relevant in relation to the sample studied by this survey. The opinion of the researchers is this may be due to the potential link between each risk factor and the *aging process*, and the effects of their combinations on the incidence and prevalence of LBP. Therefore, while research regarding other risk factors may have shown a positive link in the populations they have tested (i.e., ages 45+), this study did not show relationships in many instances since the subjects tested have experienced few if any of the physical manifestations associated with the aging process. Furthermore, certain habits such as smoking, drinking

alcohol, and depression may have cumulative effects on the body over the course of many years and those stresses may make an individual more susceptible to experiencing LBP. These considerations should be kept in mind while reviewing the remainder of the research findings.

No significant relationship was found implicating depression or unhappiness as risks for LBP, even though several research studies have shown a strong link between these factors.<sup>9,10,15-21,30,31</sup> Several possible explanations exist regarding the lack of a relationship between depression and LBP in this study. First of all, it is unknown whether each subject's LBP preceded the depression or vice versa. While research has suggested that 55% of cases of depression occur prior to onset of chronic LBP,<sup>15,17,31</sup> the temporal relationship of these factors in our sample group is unknown. It may be that depression leads to chronic LBP only when the depressive condition has lasted for a long period of time. Eighty percent of our subjects were under the age of 20. It is likely the cumulative physical effects of chronic depression were not yet apparent in students at this young age. In those cases where the LBP exists without associated depression, it may be that the discomfort associated with chronic LBP has not yet affected the subject mentally and/or emotionally.

Time spent performing aerobic exercise was not statistically related to presence or absence of LBP in young adults. This coincides with research previously reported. Studies have shown that in youth, persons participate in athletics to the same degree regardless of their level of LBP.<sup>6</sup> In later years, those with severe LBP demonstrate a decrease in activity levels, while those

with a moderate or lower level of back pain maintain their current level of activity. Therefore, while level of physical activity in young adults was not currently affected by their LBP, it may become a limiting factor in future years.

No significant relationships were found in this study regarding alcohol consumption<sup>12</sup> and number of hours spent in a sitting posture.<sup>1,5</sup> Other studies also showed no significant relationship between these factors.

No significant link between cigarette smoking and LBP was noted in the subjects in this study. However, numerous studies have shown a positive correlation between the two factors.<sup>6-11</sup> The discrepancy between the findings of this study as compared to those of other researchers may be due to age of subjects in this study and subsequent fewer years of smoking.

No statistically significant relationship was noted between obesity and LBP. Research suggests a correlation exists,<sup>10,11,23</sup> though it may be only a “weak” link<sup>14</sup> and should not be considered a prognostic factor.<sup>10</sup> The fact that other researchers discovered only a “weak” correlation may explain why a link was not found in this population of college students (i.e., the correlation was not strong enough to be noted in this study). Furthermore, the population of 377 students who responded to questions regarding height and weight is not an especially large sample size. It is possible a correlation may have been noted had the population been larger and more representative of the college population.

This research found no relationship between LBP and average daily mental stress level as opposed to previous researchers’ findings of a significant

correlation.<sup>18,30</sup> While literature most often attributes increased mental stress levels to family conflict, life events, family and work environments,<sup>18</sup> it may be that the student away at college has a lower level of mental stress due to the physical distance from the stressful affairs often implicated as primarily stressors. Alternatively, situations that cause mental stress may be different for the college student as opposed to the populations previously studied. Furthermore, the college student may react to stresses differently and may use different coping mechanisms than would an older person. Finally, as Feuerstein<sup>2</sup> suggests in his research related to the work environment, increased work demands may provide a distraction from distress and pain. College students generally have no shortage of tasks to fulfill and sheer lack of time to agonize over everyday stressors may lead to lower personal rating of mental stress.

**In those students who experience LBP, how many receive treatment, and by which disciplines?**

Very few students who reported a lifetime history of LBP had received any type of treatment. Those who sought treatment most often chose a chiropractor, followed by a medical doctor, physical therapist, or masseuse. Chiropractors were likely chosen for treatment by students due to their reputation for treating conditions of the spine. Chiropractors market their abilities to treat and manipulate the low back to a greater degree than do medical doctors since they treat a variety of ailments. The low incidence of

utilization of medical doctors causes a lack of physical therapy referrals. Furthermore, in states where direct access to physical therapy is available, services are not reimbursed by insurance companies, and many individuals are unwilling or unable to pay for medical services personally.

#### Limitations of Study

Several limitations were identified prior to completion of this study. They are the following:

1. No existing research relating back pain with young adults ages 18 to 26 was found. Some literature that was reviewed may have included this age group, but none was found that specifically targeted the same demographics as this study. Therefore, comparisons discussed in relationship to risk factors are made from a wide age group.
2. This study looked only at the University of North Dakota's general education classes. Other factors, such as climate, ethnicity, etc., may predispose UND's students to LBP that may not be present in other college students across the nation.
3. The survey was administered only to college students. Results may or may not be applicable to people ages 18 to 26 who do not attend college.
4. All information gathered came from students' self-reports. All results came from subjective data with no objective data existing to support

the findings. Participants may have had trouble recalling precise information relating to the survey's questions.

5. The portion of the survey comprised of closed-ended questions may have limited choices for the participants.

### Suggestions for Future Studies

Several changes could be made for anyone wishing to continue research or repeat this study. Since we found no other research targeted directly at this age group, further research for this group is recommended for comparison. It would be beneficial to repeat this study with 18- to 26-year-olds who do not attend college.

Administering the survey to high school students may also help determine the age at which such a high prevalence of LBP begins. Administering the survey to more students throughout colleges across the nation could increase the sample size and decrease the risk of skewed results. Simply repeating this same study at a later time would be beneficial for data collection on a different generation of students the same age.

Supportive, objective data would have assured more accurate answers to our research questions. For example, it may have been helpful to assess posture ourselves rather than having the participants self-report. Measuring height and weight may also have provided more accurate BMI measures. Weight lifting and exercising techniques could be monitored and grouped together in categories for a more objective measure of intensity. Proper form

and posturing during the activities could also be monitored and recorded. These findings could then be linked with participants' self-report of LBP.

Further research could also be directed at comparing effects of treatment and prevention. For example, subgroups of the 18- to 26-year-old population could be created who participate in different activities, such as postural training or proper exercise and weight lifting techniques. The incidence of LBP could then be compared among the groups and with controls.

Since repeated lifting, twisting, and bending were the only risk factors found to correlate with LBP, research could be targeted at looking solely on the effects of aging as it relates to LBP. Perhaps administering this survey to 26- to 34-year-olds and 34- to 42-year-olds could determine how long it takes for risk factors to play a significant role in LBP. Also, it may be beneficial to assess LBP in young adults who participate in athletics or jobs that require repeated lifting, twisting, and bending. These persons could be studied to see if the LBP subsides with cessation of the problematic activity. A longitudinal study performed on the same students repeatedly could also be helpful in identifying lifting activities as a definite risk factor. Changes in their LBP and how it corresponds with their activity level could be observed.

#### Clinical Implications

The high lifetime incidence that was found in these college students alerts health professionals to a population that may be underserved with regard to prevention and treatment of LBP. Many of the participants reporting LBP stated that their pain was chronic and had been present for more than one year.



In high schools, junior high schools, and even elementary schools, educational classes are given on the importance of proper dental hygiene; prevention of sexually transmitted diseases; the importance of abstaining from alcohol, drug, and tobacco use; and other issues pertaining to healthy living. Perhaps by incorporating classes on Lbp prevention, possibly bringing in a physical therapist for special classes as are done with sexual education classes, less young adults would suffer LBP in the future. Education on proper posture throughout the day and when lifting may be helpful. Physical education classes could include a block of lessons in proper exercising and weight lifting techniques for preventing LBP. Physical education teacher could benefit from information on the importance of maintaining flexibility and teaching pelvic stabilization exercises to their students. Our research findings suggest the need for prevention and treatment to begin before a child reaches young adulthood.

Most young people possess relatively healthy bodies capable of recovering completely from an injury. With age, the body's ability to heal itself decreases and the time associated with healing increases. However, the mechanism of injury and pain must be identified and treated in order for complete recovery to occur. Physical therapists possess the knowledge to identify numerous causes of LBP and, therefore, may choose the best treatment options, including referrals if deemed necessary. Most of the respondents in this study classified their LBP as a "dull ache" which suggests muscular involvement. The majority of respondents also felt that their LBP

resulted from poor posture and body mechanics. Physical therapists possess the knowledge of many different treatment modalities and exercises that can stop muscular LBP. Physical therapists possess assessment skills that can find faulty movement patterns, alignments, and weaknesses. Few college students sought treatment from a physical therapist. Perhaps marketing of physical therapy to young adults as an affordable option for the treatment of LBP could open a new niche within the profession. Insurance companies reimbursing for direct access to physical therapy may cut down on costs associated with doctor's visits and subsequent surgeries when the patient is older.

Since LBP is a major cost to companies and a top reason for missed days of work, future employers may benefit from college students taking a class in wellness and prevention with a specific emphasis on preventing back pain and identifying resources to treat the pain they may be suffering. The high lifetime incidence in these college students should alert college educators to the importance of possibly repeating postural training and LBP prevention after students are finished with general education classes and working within their majors. Physical therapists could be brought into business, engineering, nursing, aeronautics, construction, and teacher education classes, etc. to give a lecture on LBP prevention and treatment. A physical therapist employed by student health services on college campuses may prevent chronic LBP and future need for pain medications.

Young adults need to be made aware that although risk factors may not currently correlate with LBP, risk factors have been found to correlate with LBP

in older individuals. Smoking, obesity, lack of or overzealous activity, etc. may not correlate with LBP while they are young. But as they age, these risk factors may increase the likelihood that they will suffer from LBP. Since our study found that very few college students received treatment for their LBP, it is important to make young adults aware of the benefits of treatment. They need to be aware of the disabling effects and serious medical complications that may result from chronic back pain and dysfunction. Although their LBP may now just be more of an annoyance, eventually after years of cumulative improper stresses and insult on the tissues, significant injury could require surgery and prevent them from having a full and active adulthood.

Health professionals, employers, and parents need to be aware that back pain in young adults warrants acknowledgement and treatment. Just as doctors who treat young adults have been made aware of the importance of screening all individuals for depression to prevent chronic manifestations, it should also be of utmost importance to screen all young adults regarding back pain. LBP could be stopped and/or lessened before it has had years to cause cumulative and more severe damage. If the person participants in activities that require repeated lifting, bending, and twisting, all of which were found in our study to be significantly correlated with LBP, it may be helpful for them to modify the activity to decrease their pain and prevent chronic injury. This would give the patient a way to have some control of what is happening to his or her body.

## Conclusion

In this survey of 396 selected respondents, ages 18 to 26, the lifetime prevalence of LBP was found to be 77.5%. Only 22.5% (N = 89) reported never experiencing LBP. When asked how long these respondents had suffered from LBP, 80.4% reported that their LBP was chronic or had been present for three months or longer. The only risk factor found to be significantly correlated with LBP was repeated lifting, twisting, or bending. This study found no link between other risk factors, such as obesity, smoking, alcohol consumption, lack of or over-activity, time spent sitting, daily lifting activities, and psychological factors, and LBP. Of those with LBP, only 34.9% sought treatment, and only 25.9% of those seeking treatment saw a physical therapist. The researchers of this project have the following recommendations:

- Health professionals, parents, and employers need to be aware of the high number of young adults suffering with LBP. They need to be aware that young adult's LBP is real and warrants acknowledgement and treatment.
- Prevention and treatment for LBP should begin early in a person's life. This will help to prevent chronic LBP in older adults.
- The importance of prevention and treatment need to be marketed and made readily available and affordable for young adults.

## APPENDIX A

REPORT OF ACTION: EXEMPT/EXPEDITED REVIEW
University of North Dakota Institutional Review Board

Date: April 18, 2001 Project Number: IRB-200104-218

Name: Carrie Bristow, Jessica Nelson, Erika Buckhouse Department/College: Physical Therapy

Project Title: A Survey of College Students With and Without Low Back Pain: A Comparison of Risk Factors

The above referenced project was reviewed by a designated member for the University's Institutional Review Board on April 25, 2001 and the following action was taken:

[X] Project approved. EXPEDITED REVIEW Category No. 7
Next scheduled review is on: April 2002
[ ] The attached consent form dated is the only consent form which may be used for this study.

[ ] Project approved. EXEMPT REVIEW Category No.
This approval is valid until as long as approved procedures are followed. No periodic review scheduled unless so stated in the Remarks Section.
[ ] The attached consent form dated is the only consent form which may be used for this study.

[ ] Project approved PENDING receipt of corrections/additions. These corrections/additions should be submitted to ORPD for review and approval. This study may not be started UNTIL final IRB approval has been received. (See Remarks Section for further information.)

[ ] Project approval deferred. This study may not be started until final IRB approval has been received. (See Remarks Section for further information.)

[ ] Project denied. (See Remarks Section for further information.)

REMARKS: Any changes in protocol or adverse occurrences in the course of the research project must be reported immediately to the IRB Chairperson or ORPD.

PLEASE NOTE: Requested revisions for student proposals MUST include adviser's signature.

cc: Renee Mabey, Adviser

[Handwritten Signature]
Signature of Designated IRB Member
UND's Institutional Review Board

April 25, 2001
Date

EXPEDITED REVIEW REQUESTED UNDER ITEM 7 (NUMBER[S]) OF HHS REGULATIONS  
 EXEMPT REVIEW REQUESTED UNDER ITEM \_\_\_\_\_ (NUMBER[S]) OF HHS REGULATIONS

UNIVERSITY OF NORTH DAKOTA HUMAN SUBJECTS REVIEW FORM  
FOR NEW PROJECTS OR PROCEDURAL REVISIONS TO APPROVED  
PROJECTS INVOLVING HUMAN SUBJECTS

Please include ALL information and check ALL blanks that apply.

PRINCIPAL INVESTIGATOR: Carrie Bristow, Jessica Nelson, Erika Buckhouse TELEPHONE: 775-8814 DATE: 04-19-01  
ADDRESS TO WHICH NOTICE OF APPROVAL SHOULD BE SENT: 1920 6<sup>th</sup> Ave North Grand Forks, ND 58203  
SCHOOL/COLLEGE: Medicine DEPARTMENT: Physical Therapy PROJECT DATES: 04-09-01 to 05-18-01  
(E.g., A&S, Medicine, EHD, etc.) (Month/Day/Year)  
PROJECT TITLE: A Survey of College Students With and Without Low Back Pain: A Comparison of Risk Factors

FUNDING AGENCIES (IF APPLICABLE): \_\_\_\_\_

TYPE OF PROJECT (Check ALL that apply):  
 NEW PROJECT  CONTINUATION  RENEWAL  DISSERTATION OR THESIS RESEARCH  STUDENT RESEARCH PROJECT  
 CHANGE IN PROCEDURE FOR A PREVIOUSLY APPROVED PROJECT

DISSERTATION/THESIS ADVISER, OR STUDENT ADVISER: Renee Mabey

PROPOSED PROJECT:  INVOLVES NEW DRUGS (IND)  INVOLVES NON-APPROVED USE OF DRUG  INVOLVES A COOPERATING INSTITUTION

IF ANY OF YOUR SUBJECTS FALL IN ANY OF THE FOLLOWING CLASSIFICATION, PLEASE INDICATE THE CLASSIFICATION(S):

MINORS (<18 YEARS)  PREGNANT WOMEN  MENTALLY DISABLED  FETUSES  PERSONS WITH  
 PRISONERS  ABORTUSES  UND STUDENTS (>18 YEARS)

IF YOUR PROJECT INVOLVES ANY HUMAN TISSUE, BODY FLUIDS, PATHOLOGICAL SPECIMENS, DONATED ORGANS, FETAL MATERIAL, OR PLACENTAL MATERIALS, CHECK HERE \_\_\_\_\_

IF YOUR PROJECT HAS BEEN WILL BE SUBMITTED TO ANOTHER INSTITUTIONAL REVIEW BOARD(S), PLEASE LIST NAME OF BOARD(S): \_\_\_\_\_  
Status: \_\_\_\_\_ Submitted; Date \_\_\_\_\_ Approved; Date \_\_\_\_\_ Pending

1. ABSTRACT: (LIMIT TO 200 WORDS OR LESS AND INCLUDE JUSTIFICATION OR NECESSITY FOR USING HUMAN SUBJECTS.)

The purpose of this study is to look at certain activities, moods and behaviors to determine whether these things are done or experienced more often, less often, or as often in students without low back pain compared to those with low back pain. Certain circumstances have been found to be risk factors for low back pain in the general population. 80% of US adults will seek professional advice about low back pain, accounting for 1/3 of a billion dollars spent annually for disabilities associated with low back pain. Low back pain is a leading cause of lost work time, constituting 15-18% of all occupational injuries. Our study will concentrate on a subset of the population, college students, to determine the prevalence and risk factors associated with low back pain. The participation of students at UND in this study will aid in collecting data on a particular age demographic in order to compare results with previous studies that have been conducted on subjects of all ages. The use of college students will help identify specific risk factors for low back pain, possibly enabling physicians, physical therapists, other health professionals and young adults to protect themselves against low back pain.

**PLEASE NOTE:** Only information pertinent to your request to utilize human subjects in your project or activity should be included on this form. Where appropriate attach sections from your proposal (if seeking outside funding).

- 2. PROTOCOL:** (Describe procedures to which humans will be subjected. Use additional pages if necessary. Attach any surveys, tests, questionnaires, interview questions, examples of interview questions (if qualitative research), etc., the subjects will be asked to complete.)

The low back pain questionnaire was designed through a scientific literature review and input from a faculty member in the department of physical therapy. The questionnaire was also given to ten college students to gain additional input and establish reliability. The subjects for this study will be UND students. We have contacted several UND professors in the psychology, sociology, and biology departments and they have granted us permission to conduct our survey during their class periods. All students will be given a survey, cover letter, and a drawing to define the area of low back pain. The subjects will be asked to read the cover letter and if they so chose, to fill out the questionnaire. The questionnaires will be handed in before the students leave the classroom, immediately after they fill it out. The students can hand in a blank questionnaire if they choose not to participate. All surveys will be handed in face down to ensure confidentiality. We will explain to the subjects that by filling out a questionnaire and handing it in, they are giving us their consent to use the information in our study. To manage risks and adverse reactions the students will be informed that they can discontinue the survey at any time and their information will not be used in the study. No compensation will be given to the participants. The entire process should take approximately ten minutes. Once the information is collected it will be analyzed using the computer program SPSS and conclusions will be based upon the statistics generated. Once our research project is finalized, it will be reported in a bound article that will be housed on the 2nd floor of the Harley E. French Medical Library on the UND campus.

- 3. BENEFITS:** (Describe the benefits to the individual or society.)

Subjects involved in this study will receive no direct benefit or gain by choosing to participate. They will however, sustain indirect benefit in the realization they have contributed to the advancement of medical knowledge surrounding the risk factors involved in the incidence of low back pain among college students. The medical society and general public derive benefit from this research through the collection and analysis of data in subjects not well studied or documented (low back pain prevalence and associated risk factors in college students). The information gained from our research may aid in the efforts to decrease the incidence of back pain and the health care costs associated with it.



**4. RISKS:** (Describe the risks to the subject and precautions that will be taken to minimize them. The concept of risk goes beyond physical risk and includes risks to the subject's dignity and self-respect, as well as psychological, emotional or behavioral risk. If data are collected which could prove harmful or embarrassing to the subject if associated with him or her, then describe the methods to be used to protect the confidentiality of data obtained, debriefing procedures, storage of data, how long data will be stored (must be a minimum of three years), final disposition of data, etc.)

Subjects choosing to participate in this research project, by returning a completed survey, face no physical or financial risk in doing so. Though highly unlikely and unexpected, potential does exist for participants to suffer psychological and/or emotional stress during or upon completion of the study. Steps have been taken to minimize the frequency of these occurrences by providing each participant with information regarding purpose and methods of the study, informing them on their right to leave the study at any time without penalty, and assurance of confidentiality of all responses. Obtained data will be stored three years in a locked file in the Physical Therapy department at the University of North Dakota, after which time all confidential documents will be destroyed and disposed of. Upon completion of this study, final outcomes will be made available to survey participants and the general public in the Harley E. French Library of the Health Sciences on the campus of the University of North Dakota.

**5. CONSENT FORM:** Attach a copy of the **CONSENT FORM** to be signed by the subject (if applicable) and/or any statement to be read to the subject should be attached to this form. If no **CONSENT FORM** is to be used, document the procedures to be used to assure that infringement upon the subject's rights will not occur. Describe where signed consent forms will be kept and for how long (must be a minimum of 3 years), including plans for final disposition or destruction.

Consent forms will not be used in this research study. We will explain to the participants that they will be giving us their consent by filling out the questionnaire and returning it to us. Our cover letter, included with the survey, addresses confidentiality and informs subjects that they will not be forced to participate. Everyone in the classroom will be given a questionnaire and asked to turn it in face down. If someone wished not to fill it out, they may turn in a blank questionnaire without anyone knowing. No names, numbers, or codes will be on any of the questionnaires to ensure that the participants cannot be linked back to the information they provided.

6. For **FULL IRB REVIEW** forward a signed original and fifteen (15) copies of this completed form, including fifteen (15) copies of the proposed consent form, questionnaires, examples of interview questions, etc. and any supporting documentation to the address below. An original and 19 copies are required for clinical medical projects. In cases where the proposed work is part of a proposal to a potential funding source, one copy of the completed proposal to the funding agency (agreement/contract if there is no proposal) must be attached to the completed Human Subjects Review Form if the proposal is non-clinical; 7 copies if the proposal is clinical medical. If the proposed work is being conducted for a pharmaceutical company, 7 copies of the company's protocol must be provided.

Office of Research & Program Development  
University of North Dakota  
Grand Forks, North Dakota 58202-7134

On campus, mail to: Office of Research & Program Development, Box 7134, or drop it off at Room 105 Twamley Hall.

For **EXEMPT** or **EXPEDITED REVIEW** forward a signed original, including a copy of the consent form, questionnaires, examples of interview questions, etc. and any supporting documentation to one of the addresses above. In cases where the proposed work is part of a proposal to a potential funding source, one copy of the completed proposal to the funding agency (agreement/contract if there is no proposal) must be attached to the completed Human Subjects Review Form.

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The policies and procedures on Use of Human Subjects of the University of North Dakota apply to all activities involving use of Human Subjects performed by personnel conducting such activities under the auspices of the University. No activities are to be initiated without prior review and approval as prescribed by the University's policies and procedures governing the use of human subjects.

**SIGNATURES:**

_____	_____
Principal Investigator	Date
_____	_____
Project Director or Student Adviser	Date
_____	_____
Training or Center Grant Director	Date

**STUDENT RESEARCHERS:** As of June 4, 1997 (based on the recommendation of UND Legal Counsel) the University of North Dakota IRB is unable to approve your project unless the following "Student Consent to Release of Educational Record" is signed and included with your "Human Subjects Review Form."

**STUDENT CONSENT TO RELEASE OF EDUCATIONAL RECORD<sup>1</sup>**

Pursuant to the Family Educational Rights and Privacy Act of 1974, I hereby consent to the Institutional Review Board's access to those portions of my educational record which involve research that I wish to conduct under the Board's auspices. I understand that the Board may need to review my study data based on a question from a participant or under a random audit. The study to

which this release pertains is A Survey of College Students With and Without Low Back Pain: A Comparison of Risk Factors

I understand that such information concerning my educational record will not be released except on the condition that the Institutional Review Board will not permit any other party to have access to such information without my written consent. I also understand that this policy will be explained to those persons requesting any educational information and that this release will be kept with the study documentation.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Student Researcher

<sup>1</sup>Consent required by 20 U.S.C. 1232g.

## APPENDIX B

University of North Dakota: Department of Physical Therapy  
Carrie Bristow, SPT  
Erika Buckhouse, SPT  
Jessica Nelson, SPT

## **A Survey of College Students With and Without Low Back Pain: A Comparison of Risk Factors**

Students:

The purpose of this study is to look at certain activities, moods and behaviors and determine whether these things are done or experienced more often, less often, or as often in students without back pain as those with back pain. Certain circumstances have been found to be risk factors for low back pain in the general population. Our study will concentrate on a subset of the population, college students, to determine if the same risk factors are associated with low back pain.

All information you provide will be compiled confidentially. Your answers to this questionnaire will remain anonymous. We do ask that you sign the bottom of this paper for consent to participate in this survey. You do not have to participate. We ask for your name and NAID number so that your teacher can give extra credit for participation. Consent forms will be separated before reviewing the survey information. You can stop answering the survey at any time, even if you have already started. We do not believe that there are any risks associated with this survey. However, if you have any questions, feel free to contact our advisor or us.

The survey will only take about 5-10 minutes to complete. Results of this study will be made available to students and the general public on the 2<sup>nd</sup> floor of the Harley E. French Library located in the School of Medicine at UND. The surveys will be stored for 3 years in the PT department and will then be destroyed.

If you have any questions or concerns, please feel free to contact Jessica Nelson, Carrie Bristow, Erika Buckhouse or our advisor, Renee Maybe at 777-2831, Department of Physical Therapy, University of North Dakota.

Thank you for your help in advancing medical knowledge and aiding us in completion of this study.

Low Back Pain is described as pain  
below the ribs and down to the tailbone

Gender M F

Age \_\_\_\_\_

Height \_\_\_\_\_

Weight \_\_\_\_\_

Occupation (other than student) \_\_\_\_\_



1) Do you currently have low back pain? Y N (excluding pain associated with menstrual cramps)  
If yes, how long have you had this back pain? \_\_\_\_\_

2) If you do not currently suffer from low back pain, have you ever? Y N

IF YOU ANSWERED "NO" TO QUESTIONS 1 & 2, SKIP TO QUESTION #7

3) How often do you have low back pain? (Circle the answer which applies most)

A few times a year

Once a month

Once a week

2-3 times a week

4-6 times a week

Constantly

4) Describe the back pain you experience (circle all that apply):

Sharp

Burning

Dull ache

Tingling

Numbness

Locking

Shooting into buttocks or leg

5) When you experience back pain, how much does it limit your daily activities? (circle the one that best describes your limitations.)

a) Slight- meaning "I can still do almost everything I want to with only slight discomfort."

b) Moderate- meaning "My back hurts, but I can manage the things I do at work and/or in my spare time while suffering with the pain."

c) Severe- meaning "I have to take breaks during my work and spare time activities."

d) Very severe- meaning "I have to stay at home sick periodically."

(continued...)

64

6) Have you ever or are you receiving treatment for your back pain? Y N

If yes, who have you seen regarding your back pain? (circle all that apply)

Doctor

Physical Therapist

Chiropractor

Masseuse

Other \_\_\_\_\_

What do these health professionals say is causing your back pain? \_\_\_\_\_

What do you think causes your back pain? \_\_\_\_\_

7) Do you smoke? Y N

If yes, how many packs\* per day? \_\_\_\_\_

\*If <1 pack, how many cigarettes per day? \_\_\_\_\_

How many years have you smoked? \_\_\_\_\_

8) Do you consume alcohol? Y N

If yes, how many drinks per week on average? \_\_\_\_\_

9) How much time do you spend doing aerobic activities? (check one) This can include: running, walking, biking, swimming, playing basketball or other fast paced sports, etc.

\_\_\_\_\_ less than 30 minutes per week

\_\_\_\_\_ at least 30 minutes per day, 2-3 times per week

\_\_\_\_\_ at least 30 minutes per day, 4-5 times per week

\_\_\_\_\_ at least 30 minutes per day, 6-7 times per week

10) What position do you usually sleep in?

on your back

on your side

on your stomach

11) How many hours per day, on average, do you spend sitting? This can include: driving, in class, on the job, watching TV, etc. \_\_\_\_\_

(continued...)

- 12) Does your daily activity require repetitive lifting, twisting, or bending? Y N

Please describe this activity \_\_\_\_\_

- 13) Rate your average daily mental stress level from 0-10 by circling the number which best describes your average level of daily stress, with 0 being no stress at all and 10 being the most stress possible.

No stress 0 1 2 3 4 5 6 7 8 9 10 Most Stress

- 14) Any of the following signs and symptoms can be related to stress.  
Have you had some of the following symptoms, and how often in the last 12 months?

Rate each item 1, 2, 3, or 4, (1= seldom or never to 4= often or continuously.)

heartburn or acid troubles \_\_\_\_\_

loss of appetite \_\_\_\_\_

nausea or vomiting \_\_\_\_\_

abdominal pains \_\_\_\_\_

diarrhea or irregular bowel function \_\_\_\_\_

difficulties falling asleep or awakening at night \_\_\_\_\_

nightmares \_\_\_\_\_

headaches \_\_\_\_\_

sexual unwillingness \_\_\_\_\_

dizziness \_\_\_\_\_

racing heart beat or irregular heart rate \_\_\_\_\_

tremor of hands \_\_\_\_\_

excessive sweating without physical effort \_\_\_\_\_

lack of energy \_\_\_\_\_

shortness of breath without physical effort \_\_\_\_\_

fatigue or weakness \_\_\_\_\_

anxiety or nervousness \_\_\_\_\_

irritability or fits of anger \_\_\_\_\_

(continued...)



15) What are the major sources of your stress? (Check all that apply and put a \* next to the one you feel causes you the most stress in your average, daily life)

- \_\_\_\_\_ School
- \_\_\_\_\_ Relationships
- \_\_\_\_\_ Financial matters
- \_\_\_\_\_ Family
- \_\_\_\_\_ Job (other than school)
- \_\_\_\_\_ Physical health
- \_\_\_\_\_ Dissatisfaction with appearance
- \_\_\_\_\_ Other \_\_\_\_\_

16) Rate how often you experience the following with a 1,2,3 or 4.  
(1=seldom or never to 4=often or continuously)

- Do you often feel unhappy or depressed? \_\_\_\_\_
- Do you often have guilt feelings? \_\_\_\_\_
- Do you often worry about your future? \_\_\_\_\_
- Do you often feel quite exhausted? \_\_\_\_\_
- Do you feel generally satisfied with your life? \_\_\_\_\_
- Do frightening thoughts repeatedly come to your mind? \_\_\_\_\_

(END)

Thank you for your participation.

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